

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 3 Problem no.: 11
 Juror: Andrej Kusljin Signature: Mamun

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three beams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Germany
Sina Hartung

5

Physics ± 3

+0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Austria
Markus Niese

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: A Singapore
Wittmann Goh

5

Physics ± 3

+2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 3 Problem no.: 11
 Juror: Nirut Signature: [Signature]

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An opposition should show that:

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- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
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- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: DE 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: AT 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: SG 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 2

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

7

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Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 3 Problem no.: #11
 Juror: Hung-Chih Kuo Signature: [Signature]

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Rep.: GE 5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: AT 5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☒ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: SG 5

Physics ± 3

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

5

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Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 3 Problem no.: 11
 Juror: Alan Allinson Signature: Alan Allinson

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Rep.: Germany 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

4

Opp.: Austria 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: Singapore 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 3 Problem no.: 11
 Juror: MONSIE Signature: M. Tawfik

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• a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

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- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Germuy 5Physics ± 3

- ☐
- Correct and relevant physics
-
- ☐
- Scientific approach
-
- ☐
- Validity of conclusions
-
- ☐
- Accurate answers

Presentation ± 1

- ☐
- Clear and understandable
-
- ☐
- Appropriate manner
-
- ☐
- Overall impression

Reporter ± 1

- ☐
- Quality of experimental technique(s)
-
- ☐
- Structure
-
- ☐
- Explanation of formulae and symbols
-
- ☐
- Appropriate models, conformity of dimensions
-
- ☐
- Slides, on-site experiments, audio, video, as appropriate
-
- ☐
- References, proper citations of ideas and input of others
-
- ☐
- Novelty of the report
-
- ☐
- Contribution to the discussion

Final Grade: Reporter

4Opp.: Aushu 5Physics ± 3

- ☐
- Correct and relevant physics
-
- ☐
- Scientific approach
-
- ☐
- Validity of conclusions
-
- ☐
- Accurate answers

Presentation ± 1

- ☐
- Clear and understandable
-
- ☐
- Appropriate manner
-
- ☐
- Overall impression

Opponent ± 1

- ☐
- Response to the reporter's solution
-
- ☐
- Shows the strong and weak points of the report
-
- ☐
- Finds shortcomings or errors in the report
-
- ☐
- Relevance of the questions
-
- ☐
- Contribution to the discussion

Final Grade: Opponent

6Rev.: SG 5Physics ± 3

- ☐
- Correct and relevant physics
-
- ☐
- Scientific approach
-
- ☐
- Validity of conclusions
-
- ☐
- Accurate answers

Presentation ± 1

- ☐
- Clear and understandable
-
- ☐
- Appropriate manner
-
- ☐
- Overall impression

Reviewer ± 1

- ☐
- Provides a thorough review of report and discussion
-
- ☐
- Expresses own opinion about topics presented or discussed
-
- ☐
- Relevance of questions to both the reporter and the opponent
-
- ☐
- Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 3 Problem no.: 11
 Juror: L. Gladeruk Signature: L. Gladeruk

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
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- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
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- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Germany

5

Sina Hartung

Physics ± 3

-1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+2.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

+5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Austria

5

Markus Wiese

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Singapore

5

Wittmann Boh

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 2 Problem no.: #12
 Juror: Hung-Chih Kan Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
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- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

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Rep.: SG 5

Physics ± 3

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: GE 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: AT 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

6

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Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 2 Problem no.: 12
 Juror: Nirul Signature: Nirul

A report should include:

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Rep.: SG 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: DE 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: AT 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

5

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Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 2 Problem no.: 12

Juror: Alan Accusson Signature: Alan Accusson

(rejected 17)

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- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: SING

5

Physics ± 3

2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

$\frac{1}{2}$

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

$\frac{1}{2}$

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter

7

Opp.: GER

5

Physics ± 3

$\frac{1}{2}$

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

$\frac{1}{2}$

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

$\frac{1}{2}$

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: AUT

5

Physics ± 3

—

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

$\frac{1}{2}$

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

—

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 2 Problem no.: 12
 Juror: L. Grodzinski Signature: L. Grodzinski

A report should include:

• a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

• the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

• the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects (especially the controversial ones) • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Singapore
Witthorn Goh

Physics ± 3 1

☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0.25

☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reporter ± 1 0.75

☐ Quality of experimental technique(s)
☐ Structure
☐ Explanation of formulae and symbols
☐ Appropriate models, conformity of dimensions
☐ Slides, on-site experiments, audio, video, as appropriate
☐ References, proper citations of ideas and input of others
☐ Novelty of the report
☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Germany
Conrad Kersch

Physics ± 3 1

☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0.75

☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Opponent ± 1 0.5

☐ Response to the reporter's solution
☐ Shows the strong and weak points of the report
☐ Finds shortcomings or errors in the report
☐ Relevance of the questions
☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Austria
Markus Niese

Physics ± 3 0

☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0.5

☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reviewer ± 1 0.5

☐ Provides a thorough review of report and discussion
☐ Expresses own opinion about topics presented or discussed
☐ Relevance of questions to both the reporter and the opponent
☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 2 Problem no.: 12
 Juror: MONSIEUR Signature: M. T. T. T.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: SG 5

Physics ± 3 1.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: AI German 5

Physics ± 3 0.25

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0.25

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: AT 5

Physics ± 3 0.25

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0.25

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 2 Problem no.: 12
 Juror: Andreas Witten Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Singapore 5

Wittmann Moh

Physics ± 3 +2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Germany 5

Corina Konitz

Physics ± 3 +2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8

Rev.: Austria 5

Markus Niese

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 1 Problem no.: 4
 Junor: Andrei Kishin Signature: Karimov

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Austria
Luisa Schrampf 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 4

Opp.: Singapore
Koh Jin Ming 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 -0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 4

Rev.: Germany
Dominika Stronczek 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 1 Problem no.: #4
 Juror: Hung-Chih Kan Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: AT 5

Physics ± 3 0

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: SG 5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 -1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 4

Rev.: GE 5

Physics ± 3 [scribble]

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer 6

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 1 Problem no.: 4
 Juror: Nirut Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Austria 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Singapore 5

Physics ± 3 2

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8

Rev.: DE 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 1 Problem no.: 4
 Juror: A. ALLINSON Signature: Al

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach *nice work*
- ☐ Validity of conclusions *not correct in all cases*
- ☐ Accurate answers

Presentation ± 1 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 1 Problem no.: 4
 Juror: L. Gieseler Signature: L. Gieseler

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

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- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Australia
Luisa Schlemmer

5

Physics ± 3

0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Singapore

5

Physics ± 3

4

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Germany

5

Physics ± 3

2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 1 Stage: 1 Problem no.: 4
 Juror: HONSIT Signature: M. Tathil.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three beams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Austria 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions μ
- ☐ Accurate answers μ

Presentation ± 1 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0.5

- ☐ Quality of experimental technique(s) μ
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 8

Opp.: Singapore 5

Physics ± 3 1.25

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.75

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report \checkmark
- ☐ Finds shortcomings or errors in the report \checkmark
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8.

Rev.: German 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0.75

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent \checkmark

Final Grade: Reviewer 7.

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Round: 2 Room: 1 Fight Assistants: Mr. Komsan Papawong Mr. Thanundon Kongrak

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Austria	Singapore	Germany	Singapore	Germany	Austria	Germany	Austria	Singapore	Rep	Opp	Rev
Juror	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev
Alan Allinson (Chair)	6	7	7	7	7	6	4	5	7			
Monsit Tanasittikosol	8	8	7	7	6	6	4	6	7			
Leszek Gladczuk	7	7	8	7	7	6	5	7	7			
Nirut Pussadee	6	8	6	6	6	5	5	6	7			
Heng-Chih Kuo	5	4	6	7	6	6	5	5	5			
Andrei Klishin	4	4	7	7	8	7	5	5	8			
Acting Team Member	Laura Schrempf	Koa Jin Ming	Dominika Stanczek	Wittmann Goh	Cecilia Kanitz	Markus Niese	Sina Julia Hartung	Markus Niese	Wittmann Goh			
Rejected Problems				11 roller cup								
Accepted Problem	4 Liquid Film Polar			12 Thick Lens			11 cat's whisker					

Signature Fight Assistant: Mr. Komsan Papawong Double-checked with Scoring Guidelines by second Fight Assistant (signature): Mr. Thanundon Kongrak

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 1 Problem no.: 5
 Juror: Kathryn Zealord Signature: KZ

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Nonthaphat
Thailand 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☒ Quality of experimental technique(s) errors
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: John
USA 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Anna
Poland 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

7

excellent questions
 This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 1 Problem no.: 5
 Juror: Kerry Parker Signature: Kerry Parker

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Nonthapat Srisunthet
Thai

5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1.5

Presentation ± 1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

-

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

-0.5

Final Grade: Reporter

6.0

Opp.: John Ludowski
USA

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

-

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

+0.5

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

+0.5

Final Grade: Opponent

6

Rev.: Anne Wald
Poland

5

Physics ± 3

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

+0.5

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

+0.5

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 1 Problem no.: 5
 Juror: QIAN SUN Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: TH 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 4

Opp.: USA 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: PL 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 1 Problem no.: 5
 Juror: REQUEN Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Thailand 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: USA 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Poland 5

Physics ± 3 +2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 1 Problem no.: 5
 Juror: D. Keller Signature: D. Keller

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Thailand

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Reporter ± 1

+1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: USA

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Poland

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 1 Problem no.: _____
 Juror: Tom Jey Signature: Tom Jey

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Nanthaphat

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+0.5

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

+0.5

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

0

Final Grade: Reporter

6

Opp.: John Lukowski

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+0.5

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

+1

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

+0.5

Final Grade: Opponent

7

Rev.: Anna Wild

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

+1

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

+1

Final Grade: Reviewer

8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 2 Problem no.: 16
 Juror: Kathryn Zealeroth Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Karl
USA 5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

-2

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

+1/2

Reporter ± 1

- ☒ Quality of experimental technique(s) *limited investigation*
- ☒ Structure
- ☐ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions *missing*
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☒ Contribution to the discussion

-1/2

Final Grade: Reporter

3

Opp.: Radost
Poland 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1/2

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Opponent ± 1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

+1/2

Final Grade: Opponent

6

Rev.: Panitham
Thailand 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

-1/2

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion *don't just summarise*
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

-1/2

Final Grade: Reviewer

3

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 2 Problem no.: _____
 Juror: Kerry Park Signature: Ken for

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Karl Sewick 5

Physics ± 3 —

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 —

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 —

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report ✓ sugr
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: Radosław Waszkiewicz 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 -1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Panithan Jeensanantakul 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 —

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 4

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 2 Problem no.: 16
 Juror: CELAN SUN Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: USA 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 4

Opp.: PL 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8

Rev.: TH 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 2 Problem no.: 16
 Juror: REGUER Signature: Reguer

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: USA 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 4

Opp.: Poland 5

Physics ± 3 +1.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8

Rev.: Thailand 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 2 Problem no.: 16
 Juror: D. Keller Signature: D. Keller

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three beams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1 +1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8

Rev.: 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 2 Problem no.: 16
 Juror: Tan Jy Signature: Tan Jy

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: US
Karl

5

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Roland
Roland

5

Physics ± 3

+1.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

8

Rev.: Thailand
Porntham

5

Physics ± 3

+0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 3 Problem no.: 1
 Juror: Kathryn Zealand Signature: KRM

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Anna Poland 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1

- ☒ Quality of experimental technique(s) *nice control of data effect*
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Pian Thai 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: Brian USA 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion *Like a summary*
- ☐ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

4

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

3.59

good use of concluding remarks

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 3 Problem no.: 1
 Juror: Kerry Park Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Anna Wald

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Pian Pawakaporn

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

4

Rev.: Brian Tu

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

3

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 3 Problem no.: 1
 Juror: QIAN SON Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: RL 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: TH 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: VSA 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 3 Problem no.: 1
 Juror: REQUER Signature: Wagner

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Deland 5

Physics ±3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ±1 +0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Thailand 5

Physics ±3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ±1 +0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: USA 5

Physics ±3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1 -0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ±1 -0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 3

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 3 Problem no.: 1
 Juror: D. Keller Signature: D. Keller

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Poland 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Thailand 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: USA 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 4

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 3 Problem no.: 1
 Juror: Tan Jy Signature: Tan Jy

A report should include:

• a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

• the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

• the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects (especially the controversial ones) • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Anna 5

Physics ± 3 -0.5

- ☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reporter ± 1 -0.5

- ☐ Quality of experimental technique(s)
☐ Structure
☐ Explanation of formulae and symbols
☐ Appropriate models, conformity of dimensions
☐ Slides, on-site experiments, audio, video, as appropriate
☐ References, proper citations of ideas and input of others
☐ Novelty of the report
☐ Contribution to the discussion

Final Grade: Reporter 4

Opp.: Prian 5

Physics ± 3 0

- ☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
☐ Shows the strong and weak points of the report
☐ Finds shortcomings or errors in the report
☐ Relevance of the questions
☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Brian 5

Physics ± 3 0

- ☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
☐ Expresses own opinion about topics presented or discussed
☐ Relevance of questions to both the reporter and the opponent
☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Round: 2 Room: 2 Fight Assistants: NARASAK Jirapom Seangjae

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Thailand	USA	Poland	USA	Poland	Thailand	Poland	Thailand	USA	Rep	Opp	Rev
Juror	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev
Kathryn Zealand	6	7	7	3	6	3	7	5	4			
Kerry Parker	6	6	7	5	6	4	5	4	3			
Qian Sun	4	6	8	4	8	7	5	5	6			
Ulrike Regner	6	5	8	4	8	6	7	6	3			
Daniel Keller	7	6	6	5	8	5	6	6	4			
Joy Tan	6	7	8	6	8	7	4	5	5			
Acting Team Member	Nonthaphat Sinsuntithet	John Lukowski	Anna Wald	Karl Sewick	Radosł Waszkiewicz	Panithan Jeerasuwanndi	Anna Wald	Pian Panakapan	Brian Tu			
Rejected Problems												
Accepted Problem	5			16			1					

Signature Fight Assistant: NARASAK Double-checked with Scoring Guidelines by second Fight Assistant (signature): Jirapom Seangjae

Challenge Problem 4 Liquid film motor rejected
5 Two balloons accepted

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 1 Problem no.: 5
Juror: G. Jennings Signature: *G. Jennings*

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Romania
Alexandra Badut

5

Physics ± 3

0

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

$\frac{1}{2}$

- + ☒ Clear and understandable
- + ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1

$\frac{1}{2}$

- ☒ Quality of experimental technique(s)
- + ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Australia
Isaac Edwards

5

Physics ± 3

$\frac{1}{2}$

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

$\frac{1}{2}$

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1

0

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

6

Rev.: U.K.
Sherry Xu

5

Physics ± 3

$\frac{1}{2}$

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

$-\frac{1}{2}$

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

5

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 1 Problem no.: 5
 Juror: Wittaye Signature: Majken
Kanchanapuskrit

A report should include:

• a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

• the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

• the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects (especially the controversial ones) • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Romania 5

Physics ± 3 -0.5

- ☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reporter ± 1 1.0

- ☐ Quality of experimental technique(s)
☐ Structure
☐ Explanation of formulae and symbols
☐ Appropriate models, conformity of dimensions
☐ Slides, on-site experiments, audio, video, as appropriate
☐ References, proper citations of ideas and input of others
☐ Novelty of the report
☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Australia 5

Physics ± 3 1

- ☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Opponent ± 1 1

- ☐ Response to the reporter's solution
☐ Shows the strong and weak points of the report
☐ Finds shortcomings or errors in the report
☐ Relevance of the questions
☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: UK 5

Physics ± 3 0.5

- ☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reviewer ± 1 -0.5

- ☐ Provides a thorough review of report and discussion
☐ Expresses own opinion about topics presented or discussed
☐ Relevance of questions to both the reporter and the opponent
☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 1 Problem no.: 5
 Juror: Teparksom Pengpan Signature: T. Pengpan

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three beams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: RO 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: AU 5

Physics ± 3 1.5

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8

Rev.: GB 5

Physics ± 3 #

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1

- ☐ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): II Room: 3 Stage: 1 Problem no.: 5
 Juror: Alper Toprak Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 1 Problem no.: 5
 Juror: Ming Peng Signature: Ming Peng

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Romania 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Ans 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: UK 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 1 Problem no.: N.5
 Juror: Mitchel Zakhar Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: <u>Ron</u>	Opp.: <u>Aus</u>	Rev.: <u>UK</u>
5	5	5
Physics ±3 -1.5	Physics ±3 +1.5	Physics ±3 +1
<input type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers	<input type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers	<input type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers
Presentation ±1 0	Presentation ±1 0	Presentation ±1 0
<input type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input type="checkbox"/> Overall impression	<input type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input type="checkbox"/> Overall impression	<input type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input type="checkbox"/> Overall impression
Reporter ±1 +0.5	Opponent ±1 +0.5	Reviewer ±1 0
<input type="checkbox"/> Quality of experimental technique(s) <input type="checkbox"/> Structure <input type="checkbox"/> Explanation of formulae and symbols <input type="checkbox"/> Appropriate models, conformity of dimensions <input type="checkbox"/> Slides, on-site experiments, audio, video, as appropriate <input type="checkbox"/> References, proper citations of ideas and input of others <input type="checkbox"/> Novelty of the report <input type="checkbox"/> Contribution to the discussion	<input type="checkbox"/> Response to the reporter's solution <input type="checkbox"/> Shows the strong and weak points of the report <input type="checkbox"/> Finds shortcomings or errors in the report <input type="checkbox"/> Relevance of the questions <input type="checkbox"/> Contribution to the discussion	<input type="checkbox"/> Provides a thorough review of report and discussion <input type="checkbox"/> Expresses own opinion about topics presented or discussed <input type="checkbox"/> Relevance of questions to both the reporter and the opponent <input type="checkbox"/> Draws attention to points missed by the reporter or the opponent
Final Grade: Reporter 4	Final Grade: Opponent 7	Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Challenge problem 4 Liquid film motor accepted

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 2 Problem no.: 4
 Juror: G. Jennings Signature: Asy. Tenn.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Australia 5

Physics ± 3 -2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.2

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1 -0.2

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

3

Opp.: U.K. 5

Physics ± 3 +1/2

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 0

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1 +1/2

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Romania 5

Physics ± 3 +1/2

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 +1/2

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1/2

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 2 Problem no.: 4
 Juror: Wittaya Kanchanaprasit Signature: Wittaya

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Aus 5

Physics ± 3 -2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 4

Opp.: Uk 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Rom 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 2 Problem no.: 4
 Juror: PENG PAN Signature: T. Pengpan

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: RU 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 6

Opp.: GB 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 1

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 6

Rev.: RO 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1.5

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): II Room: 3 Stage: 2 Problem no.: 4
 Juror: Akshay Jeyaraj Signature: [Signature]

A report should include:

• a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

• the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

• the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects (especially the controversial ones) • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

4

Opp.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 2 Problem no.: 4
 Juror: Ming Tang Signature: Ming Tang

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Aus 5

Physics ± 3 -0.7

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -0.2

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 4

Opp.: VK 5

Physics ± 3 -0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 -0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 4

Rev.: Ram 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 3 Problem no.: 4
 Juror: Fakher Maszali Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: <u>Aus</u>	Opp.: <u>UK</u>	Rev.: <u>Ran</u>
5	5	5
Physics ± 3 <input type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers	Physics ± 3 <input checked="" type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers	Physics ± 3 <input type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers
-2	+2	-0.5
Presentation ± 1 <input checked="" type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input type="checkbox"/> Overall impression	Presentation ± 1 <input type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input type="checkbox"/> Overall impression	Presentation ± 1 <input type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input type="checkbox"/> Overall impression
0.5	0	0
Reporter ± 1 <input checked="" type="checkbox"/> Quality of experimental technique(s) <input type="checkbox"/> Structure <input type="checkbox"/> Explanation of formulae and symbols <input type="checkbox"/> Appropriate models, conformity of dimensions <input type="checkbox"/> Slides, on-site experiments, audio, video, as appropriate <input type="checkbox"/> References, proper citations of ideas and input of others <input type="checkbox"/> Novelty of the report <input type="checkbox"/> Contribution to the discussion	Opponent ± 1 <input type="checkbox"/> Response to the reporter's solution <input type="checkbox"/> Shows the strong and weak points of the report <input type="checkbox"/> Finds shortcomings or errors in the report <input type="checkbox"/> Relevance of the questions <input type="checkbox"/> Contribution to the discussion	Reviewer ± 1 <input type="checkbox"/> Provides a thorough review of report and discussion <input type="checkbox"/> Expresses own opinion about topics presented or discussed <input type="checkbox"/> Relevance of questions to both the reporter and the opponent <input type="checkbox"/> Draws attention to points missed by the reporter or the opponent
-0.5	0	0
Final Grade: Reporter	Final Grade: Opponent	Final Grade: Reviewer
3	7	5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Challenge problem 11 Cats Whisker accepted

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 3 Problem no.: 11
 Juror: G. Jennings Signature: G. Jennings

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: U.K.

Dominic Dootson

5

Physics ± 3

$+\frac{1}{2}$

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

$+\frac{1}{2}$

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1

0

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Romania

Horia Magureanu

5

Physics ± 3

$+\frac{1}{2}$

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

0

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1

$-\frac{1}{2}$

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

5

Rev.: Australia

Aditya Sethi

5

Physics ± 3

$+\frac{1}{2}$

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

$+\frac{1}{2}$

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reviewer ± 1

0

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 3 Problem no.: 11
 Juror: Wittaya Signature: Wittaya
Kanchanapaksit

A report should include:

• a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

• the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

• the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects [especially the controversial ones] • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: UK 5

Physics ± 3

- ☒ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 1

- ☒ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
☐ Structure
☐ Explanation of formulae and symbols
☐ Appropriate models, conformity of dimensions
☐ Slides, on-site experiments, audio, video, as appropriate
☐ References, proper citations of ideas and input of others
☐ Novelty of the report
☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Rom 5

Physics ± 3

- ☐ Correct and relevant physics
☒ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Opponent ± 1 1

- ☐ Response to the reporter's solution
☒ Shows the strong and weak points of the report
☐ Finds shortcomings or errors in the report
☐ Relevance of the questions
☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: Aus 5

Physics ± 3

- ☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reviewer ± 1 1

- ☐ Provides a thorough review of report and discussion
☐ Expresses own opinion about topics presented or discussed
☐ Relevance of questions to both the reporter and the opponent
☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 3 Problem no.: 11
 Juror: PENGPAN Signature: T. Pengpan

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: GB 5

Physics ± 3 0.5

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Reporter ± 1 1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 7

Opp.: RO 5

Physics ± 3 0.5

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Opponent ± 1 1.5

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: AU 5

Physics ± 3 -

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 11 Room: 3 Stage: 3 Problem no.: 01
 Juror: M. J. J. J. Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: _____	5	Opp.: _____	5	Rev.: _____	5
Physics ±3	1.5	Physics ±3	1.25	Physics ±3	
<input type="checkbox"/> Correct and relevant physics		<input type="checkbox"/> Correct and relevant physics		<input type="checkbox"/> Correct and relevant physics	
<input type="checkbox"/> Scientific approach		<input type="checkbox"/> Scientific approach		<input type="checkbox"/> Scientific approach	
<input type="checkbox"/> Validity of conclusions		<input type="checkbox"/> Validity of conclusions		<input type="checkbox"/> Validity of conclusions	
<input type="checkbox"/> Accurate answers		<input type="checkbox"/> Accurate answers		<input type="checkbox"/> Accurate answers	
Presentation ±1	0.5	Presentation ±1		Presentation ±1	
<input type="checkbox"/> Clear and understandable		<input type="checkbox"/> Clear and understandable		<input type="checkbox"/> Clear and understandable	
<input type="checkbox"/> Appropriate manner		<input type="checkbox"/> Appropriate manner		<input type="checkbox"/> Appropriate manner	
<input type="checkbox"/> Overall impression		<input type="checkbox"/> Overall impression		<input type="checkbox"/> Overall impression	
Reporter ±1		Opponent ±1		Reviewer ±1	
<input type="checkbox"/> Quality of experimental technique(s)		<input type="checkbox"/> Response to the reporter's solution		<input type="checkbox"/> Provides a thorough review of report and discussion	
<input type="checkbox"/> Structure		<input type="checkbox"/> Shows the strong and weak points of the report		<input type="checkbox"/> Expresses own opinion about topics presented or discussed	
<input type="checkbox"/> Explanation of formulae and symbols		<input type="checkbox"/> Finds shortcomings or errors in the report		<input type="checkbox"/> Relevance of questions to both the reporter and the opponent	
<input type="checkbox"/> Appropriate models, conformity of dimensions		<input type="checkbox"/> Relevance of the questions		<input type="checkbox"/> Draws attention to points missed by the reporter or the opponent	
<input type="checkbox"/> Slides, on-site experiments, audio, video, as appropriate		<input type="checkbox"/> Contribution to the discussion			
<input type="checkbox"/> References, proper citations of ideas and input of others					
<input type="checkbox"/> Novelty of the report					
<input type="checkbox"/> Contribution to the discussion					
Final Grade: Reporter	6	Final Grade: Opponent	5	Final Grade: Reviewer	5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 3 Problem no.: 11

Juror: Ming Feng Signature: Ming Feng

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: UK 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Rom 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: Ans 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 3 Stage: 3 Problem no.: 11
 Juror: Zakhar Mavzelis Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: <u>UK</u>	Opp.: <u>Rom</u>	Rev.: <u>Ans</u>
5	5	5
Physics ± 3	Physics ± 3	Physics ± 3
<input checked="" type="checkbox"/> Correct and relevant physics	<input checked="" type="checkbox"/> Correct and relevant physics	<input checked="" type="checkbox"/> Correct and relevant physics
<input checked="" type="checkbox"/> Scientific approach	<input checked="" type="checkbox"/> Scientific approach	<input checked="" type="checkbox"/> Scientific approach
<input checked="" type="checkbox"/> Validity of conclusions	<input checked="" type="checkbox"/> Validity of conclusions	<input checked="" type="checkbox"/> Validity of conclusions
<input checked="" type="checkbox"/> Accurate answers	<input checked="" type="checkbox"/> Accurate answers	<input checked="" type="checkbox"/> Accurate answers
Presentation ± 1	Presentation ± 1	Presentation ± 1
<input checked="" type="checkbox"/> Clear and understandable	<input checked="" type="checkbox"/> Clear and understandable	<input checked="" type="checkbox"/> Clear and understandable
<input checked="" type="checkbox"/> Appropriate manner	<input checked="" type="checkbox"/> Appropriate manner	<input checked="" type="checkbox"/> Appropriate manner
<input checked="" type="checkbox"/> Overall impression	<input checked="" type="checkbox"/> Overall impression	<input checked="" type="checkbox"/> Overall impression
Reporter ± 1	Opponent ± 1	Reviewer ± 1
<input checked="" type="checkbox"/> Quality of experimental technique(s)	<input checked="" type="checkbox"/> Response to the reporter's solution	<input checked="" type="checkbox"/> Provides a thorough review of report and discussion
<input checked="" type="checkbox"/> Structure	<input checked="" type="checkbox"/> Shows the strong and weak points of the report	<input checked="" type="checkbox"/> Expresses own opinion about topics presented or discussed
<input checked="" type="checkbox"/> Explanation of formulae and symbols	<input checked="" type="checkbox"/> Finds shortcomings or errors in the report	<input checked="" type="checkbox"/> Relevance of questions to both the reporter and the opponent
<input checked="" type="checkbox"/> Appropriate models, conformity of dimensions	<input checked="" type="checkbox"/> Relevance of the questions	<input checked="" type="checkbox"/> Draws attention to points missed by the reporter or the opponent
<input checked="" type="checkbox"/> Slides, on-site experiments, audio, video, as appropriate	<input checked="" type="checkbox"/> Contribution to the discussion	
<input checked="" type="checkbox"/> References, proper citations of ideas and input of others		
<input checked="" type="checkbox"/> Novelty of the report		
<input checked="" type="checkbox"/> Contribution to the discussion		
6	7	6
Final Grade: Reporter	Final Grade: Opponent	Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Round: 2 Room: 3 Fight Assistants: Jaru Jutimoosik ; Rojnana Tharomay

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev
Garin Jennings	6	6	5	3	6	7	6	5	6			
Wittaya Kanchanapusakit	6	7	6	4	6	6	7	7	6			
Tapaksorn Pengpan	6	8	6	6	6	7	7	7	6			
Assen Kyuldjiev	5	6	5	4	5	6	6	5	5			
Ming Feng	5	6	6	4	4	7	6	7	7			
Zakhar Maizelis	4	7	6	3	7	5	6	7	6			
Acting Team Member	Alexandra Sacot	Isaac Edwards	Yuging Xu	Grace Rehn	Nick champion	Anca Goldis	Dominic Doolson	Horia Magureanu	Aditya Sethi			
Rejected Problems	4 Liquid Film Motor			-			-					
Accepted Problem	5 Two balloons			4 Liquid Film motor			11 cat's whisker					

Signature Fight Assistant: Jaru Jutimoosik Double-checked with Scoring Guidelines by second Fight Assistant (signature): Rojnana Tharomay



Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 3 Problem no.: 6
 Juror: F. SONG Signature: F. Song

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: NZ

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

Opp.: BR

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

Rev.: IR

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 3 Problem no.: 6
 Juror: LARS GJØRVEN Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: NEW ZEALAND 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: BRAZIL 5

Physics ± 3 2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8

Rev.: IRAN 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 6

Scoring Guidelines

Fight (Round no.): II Room: 4 Stage: III Problem no.: 6
 Juror: Kulenskyi V. Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: NZ
Nicholas Lau

5

Physics ± 3

1-0.5

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

/

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

/

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

4.7

Opp.: Br
Thiago Bergamot

5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

/

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

/

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Ir
Chazou Nafedibek

5

Physics ± 3

-1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0.5

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

0.5

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

5

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 3 Problem no.: 6
 Juror: CHAINOOT Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: NZ
Nicholas

Physics ± 3 5

- ☐ Correct and relevant physics +-
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable +-
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1 1

- ☒ Quality of experimental technique(s) + know
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 6

Opp.: BR
Thiago

Physics ± 3 5

- ☒ Correct and relevant physics +
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1 1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 8

Rev.: IR
Ghazal

Physics ± 3 5

- ☐ Correct and relevant physics +-
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 6

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 3 Problem no.: 6
 Juror: Michael F. Smith Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: New Zealand

5

Physics ± 3

-0.1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0.3

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

+0.2

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Brazil

5

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+0.2

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Iran

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+0.2

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 3 Problem no.: 6
 Juror: J. BALCOMBE Signature: JB

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: NZ 5

Physics ± 3 +0.5

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: BRAZIL 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 8

Rev.: IRAN 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 6

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 2 Problem no.: 12

Juror: Few & Sore Signature: _____

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Iron 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

3

Opp.: N2 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: BR 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

56

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 2 Problem no.: 12
 Juror: LAOS GISLÉN Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: IRAN

5

Physics ± 3

-0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

-0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

4

Opp.: NGO ZEHAND

5

Physics ± 3

1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: BRAZIL

5

Physics ± 3

0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

6.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 11 Room: 4 Stage: 2 Problem no.: 12
 Juror: Kulasky V. Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Er
Nazila Sharifi

5

Physics ± 3

-1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

4

Opp.: NZ
Tess Breitenberger

5

Physics ± 3

1

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0.5

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Opponent ± 1

1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

8

Rev.: Br
Diego de Moura

5

Physics ± 3

1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

8

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 2 Problem no.: 12
 Juror: J. BALCOMBE Signature: HL Balcom

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: IRAN 5

Physics ± 3 +2

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1 —

- ☒ Quality of experimental technique(s)
- ☒ Structure n/a
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 4

Opp.: NZ 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: BRAZIL 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5/0

- ☐ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 6

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 2 Problem no.: 12
 Junor: Michael Smith Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Iran 5

Physics ± 3 -0.1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.2

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

4

Opp.: New Zealand 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.2

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 -0.1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Brazil 5

Physics ± 3 0.2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.3

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0.1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 2 Problem no.: 12
 Juror: CHAI NOOT Signature: Tejv

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Jam

5

Physics ±3

- ☐ Correct and relevant physics 4
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ±1

- ☒ Quality of experimental technique(s) -1
- ☐ Structure
- ☐ Explanation of formulae and symbols No formula
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

3

Final Grade: Reporter

Opp.: N2

5

Physics ±3

- ☒ Correct and relevant physics +
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ±1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

8

Final Grade: Opponent

Rev.: BR

5

Physics ±3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reviewer ±1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

8

Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

reject: sugar and salt

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 1 Problem no.: 3
 Juror: J. BALCOMBE Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: HAZIL 5

Physics ± 3 +0.5

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1 +0.5

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 7

Opp.: RAN 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1 +0.5

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 7

Rev.: NZ 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reviewer ± 1 +1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 8

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 1 Problem no.: 3
 Junor: CHAINOOT Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

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- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

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- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Brazil
Matheus Camacho

5

Physics ± 3

1

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Opp.: Iran
Nazila Sharifi

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Opponent ± 1

1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Rev.: New Zealand
Jack Tregidga

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reporter

6

Final Grade: Opponent

6

Final Grade: Reviewer

6

Revised after IOC feedback and approved by EC on 2011-11-03

reject: moving brush

Scoring Guidelines

Fight (Round no.): II Room: 4 Stage: 1 Problem no.: 3
 Juror: _____ Signature: _____

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
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- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

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- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Br
Mattias Camacho 5

Physics ± 3 105

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.25

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Reporter ± 1 0.25

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Ir
Maziza Shariff 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: NZ
Jack Tregidga 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 8

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 1 Problem no.: 3
 Juror: LARS GISEN Signature: [Signature]

A report should include:

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- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

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- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
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- the reviewer's personal opinion was in evidence (not just superficial observations)
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- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: BRAZIL 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: IRAN 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: UK-WIRELAND 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 1 Problem no.: 3
 Juror: F. SONG Signature: [Signature]

A report should include:

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- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: BR 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: LR 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: ANZ 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 4 Stage: 1 Problem no.: 3
 Juror: Michael E. Smith Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Brazil

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

Opp.: Iran

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

Rev.: New Zealand

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

Round: 2 Room: 4 Fight Assistants: Rarn Phinjaroenpham, Adithap Butraburi

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev
John Balcombe	7	7	8	4	6	6	7	8	6			
Chaiwoot Boonyasiri	6	6	6	3	8	8	6	8	6			
Volodymyr Kulinskyi	6	5	8	4	8	8	7	7	5			
Lars Gislén	5	6	7	4	7	6	7	8	6			
Feng Song	5	5	7	3	6	6	6	8	8			
Michael F. Smith	7	4	6	4	6	6	5	7	6			
Acting Team Member	Mathews Camacho	Nazila sharifi	Jack Tregidga	Nazila Sharifi Amira	Tess Breitmeyer	Diego Pinheiro de Moura	Nicholas Lam	Thiago Ross-White Bergamaschi	Ghazal Naghibi			
Rejected Problems	No. 15 Moving Bush			No. 8 Sugar and Salt								
Accepted Problem	No. 3 Artificial Muscle			No. 12 Thick lens.			No. 6 Magnus Glider.					

Signature Fight Assistant: Double-checked with Scoring Guidelines by second Fight Assistant (signature):

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 1 Problem no.: 8
 Junor: Felicia Ullstad Signature: Felicia Ullstad

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

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- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

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- the reviewer's personal opinion was in evidence (not just superficial observations)
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- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
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- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Bulgaria
Simon Steffens

5

Physics ± 3

+1

- ☐ Correct and relevant physics++
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Kenya
Xiong Zhuang

5

Physics ± 3

-0.5

- ☐ Correct and relevant physics -
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-1

- ☐ Clear and understandable -
- ☐ Appropriate manner
- ☐ Overall impression -

Opponent ± 1

-0.5

- ☐ Response to the reporter's solution + -
- ☐ Shows the strong and weak points of the report - -
- ☐ Finds shortcomings or errors in the report -
- ☐ Relevance of the questions +
- ☐ Contribution to the discussion -

Final Grade: Opponent

3

Rev.: China
Kehua Lu

5

Physics ± 3

+1

- ☐ Correct and relevant physics+
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+1

- ☐ Provides a thorough review of report and discussion +
- ☐ Expresses own opinion about topics presented or discussed +
- ☐ Relevance of questions to both the reporter and the opponent +
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 1 Problem no.: 8
 Junor: Norson Kerdhuanjan Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
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Reject #1, 1b

Rep.: Bulgaria 5

Physics ± 3 +2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Kenya 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: China 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 1 Problem no.: 8
 Juror: YE YEO Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Bulgaria
Timeon 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Kenya
Thurong Xiang 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 4

Rev.: China
Lu Kehan 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression


Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 1 Problem no.: 8
 Junor: Kim Freimann Signature: 

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects (especially the controversial ones) • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Bulgaria 5

Physics ± 3 1.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.3

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Kenya 5

Physics ± 3 -2

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 2

Rev.: China 5

Physics ± 3 4.5

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0.5

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 1 Problem no.: 8
 Juror: Kent Hagan Signature: Kent Hagan

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Bulgaria
Simeon Stelarov

5

Physics ± 3

+1

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Kenya
Xiang Zhiming

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

-1

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

3

Rev.: China
Kehan Lu

5

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+1/2

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+1/2

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 1 Problem no.: 8
 Juror: Kwang Kim Signature: K Kim

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: BU 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: KE 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 -1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion ☒

Final Grade: Opponent 3

Rev.: CN 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer 8

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 2 Problem no.: 9
 Juror: Felicja Ullsted Signature: Felicja Ullsted

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Kenya
Irene Ullsted

5

Physics ± 3

-1.5

- ☐ Correct and relevant physics -
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers -

Presentation ± 1

-0.5

- ☐ Clear and understandable -
- ☐ Appropriate manner
- ☐ Overall impression -

Reporter ± 1

-1

- ☐ Quality of experimental technique(s) -
- ☐ Structure -
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions -
- ☐ Slides, on-site experiments, audio, video, as appropriate +
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

2

Opp.: China
Zhenyuan Gao

5

Physics ± 3

+1

- ☐ Correct and relevant physics +
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers +

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+1

- ☐ Response to the reporter's solution +
- ☐ Shows the strong and weak points of the report +
- ☐ Finds shortcomings or errors in the report +
- ☐ Relevance of the questions +
- ☐ Contribution to the discussion +

Final Grade: Opponent

7

Rev.: Bulgaria
Njtk + Benen

5

Physics ± 3

+2

- ☐ Correct and relevant physics +
- ☐ Scientific approach
- ☐ Validity of conclusions +
- ☐ Accurate answers +

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+1

- ☐ Provides a thorough review of report and discussion +
- ☐ Expresses own opinion about topics presented or discussed +
- ☐ Relevance of questions to both the reporter and the opponent +
- ☐ Draws attention to points missed by the reporter or the opponent +

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

8

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 2 Problem no.: 9
 Juror: Hansom Kurethi Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Kenya 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

3

Opp.: China 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

8

Rev.: Budgaria 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

8

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 2 Problem no.: 9
 Juror: YF YEO Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Kenya
Angela Wanjau 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

3

Opp.: China
Gong Zhanyan 5

Physics ± 3 +1/2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1/2

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Bulgaria
Milko Brakov 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 2 Problem no.: 9
 Juror: Kim Freimann Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Kenya 5

Physics ± 3 +2

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0,3

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 3

Opp.: China 5

Physics ± 3 +0,5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0,2

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Bulgaria 5

Physics ± 3 +2,7

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 -0,5

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 6

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 2 Problem no.: 9
 Juror: Kent Hegar Signature: _____

<p>A report should include:</p> <ul style="list-style-type: none"> • a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner 	<p>An opposition should show that:</p> <ul style="list-style-type: none"> • the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report 	<p>A review should show that:</p> <ul style="list-style-type: none"> • the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects (especially the controversial ones) • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-biased and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent
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- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Kenya Wanyonyi 5

Physics ± 3 -2

Presentation ± 1 0

Reporter ± 1 -1

Reporter

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers
- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -1

Final Grade: Reporter

2

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Opp.: Ching Zhuying Gang 5

Physics ± 3 +1

Presentation ± 1 0

Opponent ± 1 0

Opponent

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers
- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

Final Grade: Opponent

6

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Reviewer

7

Rev.: Bubara Mito Bello 5

Physics ± 3 +1

Presentation ± 1 0

Reviewer ± 1 +1

Reviewer

- ☐ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent
- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 2 Problem no.: 9
 Junor: Kwang Kim Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: KE 5

Physics ± 3 -1

- ☐ Correct and relevant physics -1
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☐ Clear and understandable -1
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions -1
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 2

Opp.: CN 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: BU 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 3 Problem no.: 5
 Juror: Felicia Vilstad Signature: Felicia Vilstad

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: China

5

Guang He Tang

Physics ± 3

+1.5

- ☐ Correct and relevant physics +
- ☐ Scientific approach + -
- ☐ Validity of conclusions +
- ☐ Accurate answers +

Presentation ± 1

+0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s) +
- ☐ Structure
- ☐ Explanation of formulae and symbols -
- ☐ Appropriate models, conformity of dimensions +
- ☐ Slides, on-site experiments, audio, video, as appropriate +
- ☐ References, proper citations of ideas and input of others -
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Bulgaria

5

Miroslav Chirakov

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-0.5

- ☐ Clear and understandable
- ☐ Appropriate manner -
- ☐ Overall impression

Opponent ± 1

+0.5

- ☐ Response to the reporter's solution +
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions +
- ☐ Contribution to the discussion -

Final Grade: Opponent

6

Rev.: Kenya

5

Nathan Antoku

Physics ± 3

-0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

-1

- ☐ Provides a thorough review of report and discussion -
- ☐ Expresses own opinion about topics presented or discussed -
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent -

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

3

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 3 Problem no.: 5
 Juror: Narasim K. K. K. Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: China

5

Physics ± 3

+2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

+1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Bulgaria

5

Physics ± 3

+2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Kanya

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

-1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

4

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 3 Problem no.: 5
 Juror: YE YEO Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: China
Cong Guanghe 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Bulgaria
Nikolay 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: Kenya
5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0


- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

5

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 3 Problem no.: 5
 Juror: Kim Freeman Signature: 

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: China 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.3

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Bulgaria 5

Physics ± 3 +1.3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 -0.5

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Kenya 5

Physics ± 3 -2.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 3

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 3 Problem no.: 5
 Juror: Kent Hogan Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: China
Yanghe Long

5

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Bulgaria
Nikolay Nikolov

5

Physics ± 3

+1 1/2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+1 1/2

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Kenya
Nathan Antebus

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-1/2

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

5

Scoring Guidelines

Fight (Round no.): 2 Room: 5 Stage: 3 Problem no.: 5
 Juror: Kwang Kim Signature: K Kim

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: CN 5

Physics ± 3 0.5

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

Opp.: BU 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

Rev.: KE 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

Round: 2 Room: 5 Fight Assistants: Tameesak Chaiyakhun, Wanchaleem Poomsawat

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Bulgaria Rep	Korea Opp	China Rev	Kenya Rep	China Opp	Bulgaria Rev	China Rep	Bulgaria Opp	Kenya Rev	Rep	Opp	Rev
Juror												
Felicia Ullstad	6	3	7	2	7	8	7	6	3			
Norason Kundhikanjana	7	5	7	3	8	8	7	7	4			
Ye / Yeo	7	4	7	3	7	7	5	5	5			
Kim Freiman	6	2	7	3	6	6	6	6	3			
Kent Hogan	6	3	7	2	6	7	6	7	5			
Kwang Joo Kim	6	3	8	2	5	7	6	7	7			
Acting Team Member	Simeon Stefanov	Xiong Zhuang	Kehan Lu	Iruga Wanjau	Zhenyan Gong	Mitko Benkov	Gaanghe Long	Nikolay Nikolov	Nathan Antrobus			
Rejected Problems	① Packing ⑩ Wet and dark			③ Artificial muscle ⑭ Circle of light ⑰ Coffee cup			-					
Accepted Problem	⑧ Sugar and Salt			⑨ Hover craft			⑤ Two balloons					

Signature Fight Assistant: Wanchaleem Poomsawat Double-checked with Scoring Guidelines by second Fight Assistant (signature): Tameesak

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 1 Problem no.: 12
 Juror: Lobyshev Signature: Wolke

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Switz 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Sweden 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: Ukraine 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: F6 Stage: 1 Problem no.: 12

Juror: Helmut Dürr Signature: Id

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Switzerland 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Sweden 5

Physics ± 3 +0.4

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.7

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: Ukraine 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.3

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.7

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 1 Problem no.: 12 Thick lens
 Juror: Sureerat Homhuan Signature: Sureerat Homhuan

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three beams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Switzerland

5

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

+0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Sweden

5

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Ukraine

5

Physics ± 3

-

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

-0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

4

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 1 Problem no.: 12
 Juror: Chun-Ying Li Signature: Chun-Ying Li

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three beams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Swiss 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Sweden 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Opponent ± 1 +1

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: UKuine 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): II Room: 6 Stage: 1 Problem no.: 12
 Juror: Timoshenko Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Switzerland 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Sweden 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Ukraine 5

Physics ± 3 +2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 1 Problem no.: 12
 Juror: Sat Nany Chan Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Switzerland 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 8

Opp.: Sweden 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Ukraine 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 -0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 2 Problem no.: 10
 Junior: Lobyshev Signature: Vlobu

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Sweden 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Ukraine 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Switzerland 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer 8

Scoring Guidelines

Fight (Round no.): 2 Room: F6 Stage: 2 Problem no.: 10

Juror: Helmut Dürr Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three beams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Sweden 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.7

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 8

Opp.: Ukraine 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 7

Rev.: Switzerland 5

Physics ± 3 0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer +8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 2 Problem no.: 10 Singing Blade
 Juror: Sureerat Homhuan Signature: Sureerat Homhuan

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Sweden

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

5

Final Grade: Reporter

Opp.: Ukraine

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

6

Final Grade: Opponent

Rev.: Switzerland

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

8

Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 2 Problem no.: 10
 Juror: Chuan-Yang Li Signature: Chuan-Yang Li

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Sweden 5

Physics ± 3 -0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 +1.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -0.5

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: Ukraine 5

Physics ± 3 +0.5

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Swiss 5

Physics ± 3 -0.5

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): II Room: 6 Stage: 2 Problem no.: 10
 Juror: Timoshchenko Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Sweden

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Ukraine

5

Physics ± 3

+2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Swiss

5

Physics ± 3

+10

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 2 Problem no.: 10
 Junor: Jat Neng Chan Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Sweden 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Ukraine 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: CH 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 3 Problem no.: 9
 Juror: Lobyshev Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Ukraine 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: Switz. 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Sweden 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: F6 Stage: 3 Problem no.: 9
 Juror: Helmut Dürrast Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects (especially the controversial ones) • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Ukraine 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.2

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: Switzerland 5

Physics ± 3 +0.7

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.3

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Sweden 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Hovcraft

Fight (Round no.): 2 Room: 6 Stage: 3 Problem no.: 9
 Juror: Sureerat Homhuan Signature: Sureerat Homhuan

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Ukraine

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Switzerland

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Sweden

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

8

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 3 Problem no.: 9
 Juror: Chun-Yang Li Signature: Chun-Yang Li

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Ukraine 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Swiss 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Sweden 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1.5

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 8

Scoring Guidelines

Fight (Round no.): II Room: 6 Stage: 3 Problem no.: 9
 Juror: Timoshchenko Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Ukraine 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: Swiss 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Sweden 5

Physics ± 3 0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 6 Stage: 3 Problem no.: 9
 Junor: Tat Ming Chan Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Ukraine 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Switzerland 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 6

Rev.: Sweden 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 6

8

Round: 2 Room: 6 Fight Assistants:

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Switzerland	Sweden	Ukraine	Sweden	Ukraine	Switzerland	Ukraine	Switzerland	Sweden	Rep	Opp	Rev
Juror	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev
Iat Neng Chan	8	6	5	7	5	7	6	6	6			
Igor Timashchenko	6	6	7	5	7	7	5	5	7			
Chuan Yong Li	6	7	7	5	6	6	7	5	8			
Sureerat Homhuan	7	7	4	5	6	8	5	6	8			
Helmut Durrast	7	7	6	8	7	8	5	6	7			
Valentin Lobyshev	6	7	8	6	6	8	5	5	7			
Acting Team Member	Marc Bitterli	Ivar Eriksson	Oleh Melnyk	Fransiska Aspegren	Mykyta Rohovij	Kathrin Laxhuber	Zaitseva Olha	Michael Rogenmann	Toomas Liiv			
Rejected Problems												
Accepted Problem	12			10			9					

Signature Fight Assistant: Smitze Double-checked with Scoring Guidelines by second Fight Assistant (signature): Jintana

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 1 Problem no.: 4
 Juror: S. Bylund Signature: J. Bylund

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Macao

5

Physics ± 3

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☒ Contribution to the discussion

4

Final Grade: Reporter

Opp.: Slowking

5

Physics ± 3

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

6

Final Grade: Opponent

Rev.: Taiwan

5

Physics ± 3

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reviewer ± 1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

6

Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 1 Problem no.: 4 (Liquid)
 Juror: Pornrat Wattanakasimich Signature: Pro 2r

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Macao 5

Physics ± 3 -0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1 +0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Slovakia 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1 +1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Taiwan 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reviewer ± 1 +0.5

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 1 Problem no.: 4
 Juror: Mattias Andersson Signature: M.A.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Macao

5

Physics ± 3

-0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

+0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

4

Opp.: Slovakia

5

Physics ± 3

+0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report +
- ☐ Finds shortcomings or errors in the report +
- ☐ Relevance of the questions +
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Taiwan

5

Physics ± 3

+0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed +
- ☐ Relevance of questions to both the reporter and the opponent +
- ☐ Draws attention to points missed by the reporter or the opponent +

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): II Room: 7 Stage: I Problem no.: 4
 Juror: PANOŠOVA' DAGMAR Signature: Pau.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Micras 5

Physics ± 3 -1/2

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1/2

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -1/2

- ☐ Quality of experimental technique(s)
- ☒ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

Opp.: Slovakia 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1/2

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1

- ☒ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

Rev.: Taiwan 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1/2

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 1 Problem no.: 4
 Juror: PETER JENEI Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem • an explanation of the observed phenomena • an application of appropriate mathematics • reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate) • linking of theoretical and experimental findings to draw suitable conclusions • an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles • the opponent understood the appropriate mathematics presented • the opponent critiqued the experimental technique used and questioned the validity of the data • the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent • the reviewer appreciated the important aspects (especially the controversial ones) • the reviewer's personal opinion was in evidence (not just superficial observations) • such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: MACAO 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: SLOVAKIA 5

Physics ± 3 +2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 8

Rev.: TAIWAN 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 1 Problem no.: 4
 Junor: TATIANA G.S. Signature: TGS

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: MACAO
XIE JINGYI

5

Physics ± 3

+0.5

- ☐ Correct and relevant physics
- +0.25 ☒ Scientific approach
- ☐ Validity of conclusions
- +0.25 ☒ Accurate answers

Presentation ± 1

-0.25

- 0.25 ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

-0.25

- +0.25 ☒ Quality of experimental technique(s)
- 0.25 ☒ Structure
- 0.25 ☒ Explanation of formulae and symbols
- 0 ☐ Appropriate models, conformity of dimensions
- 0 ☐ Slides, on-site experiments, audio, video, as appropriate
- 0 ☐ References, proper citations of ideas and input of others
- 0 ☐ Novelty of the report
- 0 ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: SLOVAKIA
MIROSLAV

5

Physics ± 3

+0.5

- ☒ Correct and relevant physics +0.25
- ☐ Scientific approach
- ☒ Validity of conclusions +0.25
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+0.5

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

lost a lot time in
 only one question

Final Grade: Opponent

6

Rev.: TAIWAN
YIN-CHIEH

5

Physics ± 3

+1

- ☒ Correct and relevant physics +0.25
- ☒ Scientific approach +0.25
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+0.25

- ☒ Clear and understandable +0.25
- ☒ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+0.25

- ☒ Provides a thorough review of report and discussion +0.25
- ☒ Expresses own opinion about topics presented or discussed +0.25
- ☒ Relevance of questions to both the reporter and the opponent +0.25
- ☒ Draws attention to points missed by the reporter or the opponent 0

This sheet will be collected by the
 fight assistant, so we can scan it and
 archive your partial grades – please
 do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 2 Problem no.: 9
 Juror: S. Zylaud Signature: C. Zylaud

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Slovakia 5

Physics ± 3 +1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 +1/2

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Taiwan 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1 0

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Malta 5

Physics ± 3 0

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1/2

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Reviewer ± 1 -1/2

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer 4

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 2 Problem no.: 9 (Homer)
 Juror: Bornrat Mattanakajirakul Signature: ho 25

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Slovakia 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1 +0.5

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Taiwan 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1 +1

- ☒ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 7

Rev.: Macao 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reviewer ± 1 +0.5

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 6

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 2 Problem no.: 9
 Juror: Mattias Andersen Signature: M.A.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Slovakia 5

Physics ± 3 +2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Taiwan 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Macao 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 -1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 3

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 1 Room: 7 Stage: 1 Problem no.: 9
 Juror: PANDORA' SAKAR Signature: Pau

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Slovakia 5

Physics ± 3 +1.5

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +1/2

- ☐ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Taiwan 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Macar 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 5

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 2 Problem no.: 9
 Juror: PETER JENEL Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: SLOVAKIA

5

Physics ± 3

3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

8

Opp.: THURIN

5

Physics ± 3

1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: MACAO

5

Physics ± 3

-1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

4

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 2 Problem no.: 9

Juror: TATIANA G. S. Signature: TGS

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: SLOVAKIA
Edmond

5

Physics ± 3

+2

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

-0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1

-0.5

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: TAIWAN
Hong-Tai Chu

5

Physics ± 3

+0.5

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

-0.5

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: MACAO
Chao Kwai In

5

Physics ± 3

+0.5

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-0.5

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

0

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

5

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 3 Problem no.: 7
 Juror: S. Byland Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Taiwan

5

Physics ±3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ±1

0

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☐ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Macap

5

Physics ±3

-1/2

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ±1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Opponent ±1

-1/2

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

4

Rev.: Slovakia

5

Physics ±3

1

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1

1/2

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ±1

+1/2

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): 2 Room: 2 Stage: 3 Problem no.: 7 (Shooting pole)
 Juror: Ennat Wattanaka-singh Signature: hw 25

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Taiwan

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1

+1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Macao

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1

0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: Slovakia

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reviewer ± 1

+1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 3 Problem no.: 7
 Juror: Mattias Andersson Signature: M.A.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Taiwan 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 5

Opp.: Macao 5

Physics ± 3 0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Slovenia 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed +
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 6

Scoring Guidelines

Fight (Round no.): II Room: 7 Stage: IV Problem no.: 7
 Juror: PANDSANA ZAGMAR Signature: Pau.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Thiraw 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +1/2

- ☐ Quality of experimental technique(s)
- ☒ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 4

Opp.: Mheao 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☒ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 0

- ☒ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 4

Rev.: Sombin 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 3 Problem no.: 7

Juror: PETER JENEI Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: TAIWAN 5

Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 4

Opp.: MACAO 5

Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 -1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: SLOVAKIA 5

Physics ± 3 2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 7

Scoring Guidelines

Fight (Round no.): 2 Room: 7 Stage: 3 Problem no.: 7

Juror: TATYANA G. G. Signature: TGS

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Taiwan
Hao Yu Ku

5

Physics ± 3

-0.25

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

+0.25

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: MACAO
Chen Hai Jin

5

Physics ± 3

0

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: SLOVAKIA
Adrian Vekic

5

Physics ± 3

+1

- ☒ Correct and relevant physics +0.5
- ☒ Scientific approach +0.25
- ☒ Validity of conclusions +0.25
- ☒ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

7

Round: 2 Room: 7 Fight Assistants: Kanjana Suponok

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Macau	Slovakia	Taiwan	Slovakia	Taiwan	Macau	Taiwan	Macau	Slovakia	Rep	Opp	Rev
Juror	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev
Samuel Byland	4	6	6	7	5	4	5	4	7			
Pornrat Wattanakasinich	5	7	6	7	7	6	7	5	7			
Mattias Anderson	4	6	7	7	5	3	5	5	6			
Dagmar Panosava	4	7	7	6	5	5	4	4	7			
Peter Jenei	5	8	7	8	6	4	4	5	7			
Tatyana Gongalves Slankovius	5	6	7	6	5	5	5	5	7			
Acting Team Member	Xie Jingyi	Miroslav Gasperek	Yin-Chieh Cheng	Eduard Oravkin	Neng-Tai Chiu	Chou Hou In	Hao Yu Ku	Chou Hou In	Adam Urban			
Rejected Problems				b. Magnus Glider			11. Cat's Whisker					
Accepted Problem	4. Liquid Film Motor			9. Hovercraft			7. Shaded Pole					

Signature Fight Assistant:..... Double-checked with Scoring Guidelines by second Fight Assistant (signature):

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 1 Problem no.: 8
 Juror: O'Neill Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: CZECH 5

Physics ±3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

Presentation ±1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ±1

- ☐ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: NIGERIA 5

Physics ±3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ±1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

4

Rev.: BEARUS 5

Physics ±3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ±1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ±1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: #8 Stage: Final Problem no.: 8 (Sugar)
 Juror: Apichay Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Czech Rep

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

-1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

4

Opp.: Nigeria

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

-1

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

-1

Final Grade: Opponent

4

Rev.: Bolivia

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

-1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

-1

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

+1

Final Grade: Reviewer

4

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Fight (Round no.): 2 Room: 8 Stage: 1 Problem no.: 8
Juror: Holmström, Mikael Signature: [Signature]

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- Rep.:
- Cred Rep.

5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

D

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

4

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

4

Opp.: Urgent

5

3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

0

- ☐ Clear and understandable
☐ Appropriate manner
☒ Overall impression

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

5

Rev.: Below

5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

- ☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

6

This sheet will be collected by the flight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 1 Problem no.: 888
 Juror: Yung-Yuan Hsu Signature: Yung-Yuan Hsu

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Tomás Domes
Czech

5

Physics ± 3

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

-1.5

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

+0.5

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

-1

Final Grade: Reporter

2

Opp.: Philip Zhusk
Nigeria

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

1/3

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☐ Contribution to the discussion

1/3

Final Grade: Opponent

7

Rev.: Anastasiya
Belarus

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

0.5

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reviewer ± 1

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

0.5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 1 Problem no.: 8
 Juror: Shchetnikov Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

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- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

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- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
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- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

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- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: <u>Czech</u>	Opp.: <u>Nigeria</u>	Rev.: <u>Belarus</u>
5	5	5
Physics ± 3	Physics ± 3	Physics ± 3
<input checked="" type="checkbox"/> Correct and relevant physics	<input checked="" type="checkbox"/> Correct and relevant physics	<input type="checkbox"/> Correct and relevant physics
<input type="checkbox"/> Scientific approach	<input type="checkbox"/> Scientific approach	<input type="checkbox"/> Scientific approach
<input type="checkbox"/> Validity of conclusions	<input type="checkbox"/> Validity of conclusions	<input type="checkbox"/> Validity of conclusions
<input type="checkbox"/> Accurate answers	<input type="checkbox"/> Accurate answers	<input type="checkbox"/> Accurate answers
Presentation ± 1	Presentation ± 1	Presentation ± 1
<input type="checkbox"/> Clear and understandable	<input checked="" type="checkbox"/> Clear and understandable	<input checked="" type="checkbox"/> Clear and understandable
<input type="checkbox"/> Appropriate manner	<input type="checkbox"/> Appropriate manner	<input type="checkbox"/> Appropriate manner
<input type="checkbox"/> Overall impression	<input type="checkbox"/> Overall impression	<input type="checkbox"/> Overall impression
Reporter ± 1	Opponent ± 1	Reviewer ± 1
<input type="checkbox"/> Quality of experimental technique(s)	<input type="checkbox"/> Response to the reporter's solution	<input checked="" type="checkbox"/> Provides a thorough review of report and discussion
<input type="checkbox"/> Structure	<input checked="" type="checkbox"/> Shows the strong and weak points of the report	<input checked="" type="checkbox"/> Expresses own opinion about topics presented or discussed
<input type="checkbox"/> Explanation of formulae and symbols	<input checked="" type="checkbox"/> Finds shortcomings or errors in the report	<input type="checkbox"/> Relevance of questions to both the reporter and the opponent
<input checked="" type="checkbox"/> Appropriate models, conformity of dimensions	<input checked="" type="checkbox"/> Relevance of the questions	<input type="checkbox"/> Draws attention to points missed by the reporter or the opponent
<input type="checkbox"/> Slides, on-site experiments, audio, video, as appropriate	<input type="checkbox"/> Contribution to the discussion	
<input checked="" type="checkbox"/> References, proper citations of ideas and input of others		
<input type="checkbox"/> Novelty of the report		
<input type="checkbox"/> Contribution to the discussion		
Final Grade: Reporter <u>4</u>	Final Grade: Opponent <u>5</u>	Final Grade: Reviewer <u>5</u>

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 1 Problem no.: 8
 Juror: Buxin Signature: Buxin

Sugar + Salt

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Tomas Domes

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

4

Final Grade: Reporter

Opp.: Philip Elushe

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

4

Final Grade: Opponent

Rev.: Arutasya Podmizko

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

5

Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 2 Problem no.: 9

Juror: O'NEILL Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: NIGERIA

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

-1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

-1

Final Grade: Reporter

3

Opp.: BELARUS

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

0

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Opponent ± 1

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

0

Final Grade: Opponent

5

Rev.: SZECH

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

1/2

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

-1/2

Reviewer ± 1

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

1/2

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: #6 Stage: 1 Problem no.: 9 (Hoversaft)
 Juror: A. Pichart Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Nigeria
(Philip)

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

-1.0

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

-0.5

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

-0.5

Final Grade: Reporter

3

Opp.: Bolivia
(Daniel)

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Czech Rep
(PETR)

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0.5

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

0.5

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 18 Problem no.: 9
 Junor: HOMOTIDEI, KIMMCH Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Mijerim

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

0.5

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

-0.5

Final Grade: Reporter

4

Opp.: Belen

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

0

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

-1

Final Grade: Opponent

4

Rev.: Gael Rego

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

1

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

1

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

8

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 2 Problem no.: 9
 Juror: Yang-Yuan Hsu Signature: Yang-Yuan Hsu

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Philip Elushade
Nigeria.

5

Physics ± 3

+1.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+0.7

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter

4

Opp.: Daniil Yarmolkevich
Belarus.

5

Physics ± 3

+0.5

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: Peter Sosna
Czech.

5

Physics ± 3

1/2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

1/2

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 2 Problem no.: 9
 Juror: Shchetnikov Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Nigeria 5

Physics ± 3 -1.5

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 -0.5

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 3

Opp.: Belarus 5

Physics ± 3

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1 +0.5

- ☒ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Czech 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer 4

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 2 Problem no.: 9
 Junor: Burin Signature: Burin

Howcroft

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Philip

Elushade

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

4

Final Grade: Reporter

Opp.: Daniel

Yarmobovich

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

4

Final Grade: Opponent

Rev.: Petr

Sosna

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

5

Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 3 Problem no.: 14

Juror: O'NEILL Signature: P. GONNARD

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: BELARUS 5

Physics ± 3 1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reporter ± 1 1

- ☐ Quality of experimental technique(s)
- ☒ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

Opp.: CZECH 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1 1/2

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 1/2

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

Rev.: NIGERIA 5

Physics ± 3 1/2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 1/2

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 1/2

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

Scoring Guidelines

Fight (Round no.): 2 Room: #5 Stage: 1st Problem no.: 14 (Circuit right)
 Juror: Apichart Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Belarus
(Rebecca)
(Veronika)
 Physics ± 3 +1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reporter ± 1 0.5
☐ Quality of experimental technique(s)
☐ Structure
☐ Explanation of formulae and symbols
☐ Appropriate models, conformity of dimensions
☐ Slides, on-site experiments, audio, video, as appropriate
☐ References, proper citations of ideas and input of others
☐ Novelty of the report
☐ Contribution to the discussion

Final Grade: Reporter

Opp.: Czech Rep
(Pavla)
 Physics ± 3 -0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Opponent ± 1 +1
☐ Response to the reporter's solution
☐ Shows the strong and weak points of the report
☐ Finds shortcomings or errors in the report
☐ Relevance of the questions
☐ Contribution to the discussion

Final Grade: Opponent

Rev.: Nigeria
(Rebecca)
 Physics ± 3 -1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reviewer ± 1 +1
☐ Provides a thorough review of report and discussion
☐ Expresses own opinion about topics presented or discussed
☐ Relevance of questions to both the reporter and the opponent
☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 3 Problem no.: 14

Juror: HONORARI, HINDU Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Pobara

5

Physics ± 3

+0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

+0.5

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: And. Kralic

5

Physics ± 3

+0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

+0.5

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Mijena

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

0

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

5

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 3 Problem no.: 14
 Juror: Yung-Yuan Hsu Signature: Yung-Yuan Hsu

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Vera Vukobratovic
Belarus

5

Physics ± 3

1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

1/3

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

*diffraction
interference*

Final Grade: Reporter

6

Opp.: Paula Bérková
Czech

5

Physics ± 3

1/2

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

-1/3

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

5

Rev.: Rebecca Banya
Nigeria

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

1/3

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 3 Problem no.: _____
 Juror: Shchetnikov Signature: _____

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Belarus

5

Physics ± 3

+1.5

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

+0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Reporter ± 1

+1

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

8

Opp.: Czech

5

Physics ± 3

+1

- ☒ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☒ Accurate answers

Presentation ± 1

+0.5

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☒ Overall impression

Opponent ± 1

+0.5

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Nigeria

5

Physics ± 3

0

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☒ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

+0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Reviewer ± 1

-0.5

- ☐ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

5

Scoring Guidelines

Fight (Round no.): 2 Room: 8 Stage: 3 Problem no.: 14
 Juror: Burnin Signature: Burnin

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Veronika Tokarova 5

Physics ± 3 1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1 +1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter 7

Opp.: Paula Berezova 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent 5

Rev.: Rebecca Bonyo 5

Physics ± 3 -0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer 5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

2

Round: 2 Room: 8 Fight Assistants: Samchoi 8 Jadsada

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Czech Republic	Nigeria	Belarus	Nigeria	Belarus	Czech Republic	Belarus	Czech Republic	Nigeria	Rep	Opp	Rev
Juror	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev	Rep	Opp	Rev
Philip O'Neill (chair)	5	4	6	3	5	6	8	7	6			
Apichart Pattanapattana	4	4	4	3	6	7	7	6	5			
Mihály Homóstei	4	5	6	4	4	8	7	6	5			
Yung-Yuna Hsu	2	7	6	4	5	6	6	5	5			
Andrey Shchetnikov	4	5	5	3	5	4	8	7	5			
Burin Annapibhop	4	4	5	4	4	5	7	5	5			
Acting Team Member	Tomas Domes.	Philip Elushade.	Anastasiya Podnako	Philip Elushade	Daniil Yarmolkevich.	Petr Sosna	Veronika Tokareva.	Paula Beresova	Rebecca Danjo			
Rejected Problems	(1) (2)											
Accepted Problem	(8)			(9)			(14)					

Signature Fight Assistant: Samchoi Double-checked with Scoring Guidelines by second Fight Assistant (signature): Jadsada

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 1 Problem no.: 15
 Juror: Ilya KARACHENKO Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: <u>Korea</u> <u>Sebeom Lee</u>	Opp.: <u>Russia</u> <u>Viktor Makusim</u>	Rev.: <u>Hungary</u> <u>Abel Beregi</u>
5	5	5
Physics ± 3 <input type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers	Physics ± 3 <input type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers	Physics ± 3 <input type="checkbox"/> Correct and relevant physics <input type="checkbox"/> Scientific approach <input type="checkbox"/> Validity of conclusions <input type="checkbox"/> Accurate answers
-1	+1	0
Presentation ± 1 <input type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input type="checkbox"/> Overall impression	Presentation ± 1 <input type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input checked="" type="checkbox"/> Overall impression	Presentation ± 1 <input type="checkbox"/> Clear and understandable <input type="checkbox"/> Appropriate manner <input type="checkbox"/> Overall impression
+1	0	0
Reporter ± 1 <input type="checkbox"/> Quality of experimental technique(s) <input type="checkbox"/> Structure <input type="checkbox"/> Explanation of formulae and symbols <input type="checkbox"/> Appropriate models, conformity of dimensions <input type="checkbox"/> Slides, on-site experiments, audio, video, as appropriate <input type="checkbox"/> References, proper citations of ideas and input of others <input type="checkbox"/> Novelty of the report <input type="checkbox"/> Contribution to the discussion	Opponent ± 1 <input type="checkbox"/> Response to the reporter's solution <input type="checkbox"/> Shows the strong and weak points of the report <input type="checkbox"/> Finds shortcomings or errors in the report <input type="checkbox"/> Relevance of the questions <input type="checkbox"/> Contribution to the discussion	Reviewer ± 1 <input type="checkbox"/> Provides a thorough review of report and discussion <input type="checkbox"/> Expresses own opinion about topics presented or discussed <input type="checkbox"/> Relevance of questions to both the reporter and the opponent <input type="checkbox"/> Draws attention to points missed by the reporter or the opponent
0	0	0
Final Grade: Reporter	Final Grade: Opponent	Final Grade: Reviewer
5	6	5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 1 Problem no.: 15
 Juror: Suz Napier Signature: Suz Napier

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Sebeom Lee 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☒ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Vitalii Motun 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Abel Beregi 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 1 Problem no.: 15
 Juror: Namun Signature: N8

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Korea

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Russia

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent

6

Rev.: Hungary

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

6

Rejected: #3, #10

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 1 Problem no.: 15
 Juror: Afaskynski Signature: BK

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Korea

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

0

Presentation ± 1

- ☒ Clear and understandable
- ☒ Appropriate manner
- ☐ Overall impression

+1

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

0

Final Grade: Reporter

6

Opp.: Russia

5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Opponent ± 1

- ☐ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

0

Final Grade: Opponent

6

Rev.: Hungary

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

0

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

0

Final Grade: Reviewer

5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 1 Problem no.: 15
 Juror: Uls Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Korea

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Russia

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Hungary

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

6

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 1 Problem no.: 8, 14, 15
 Juror: Ginka Exner Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing "answers" when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Korea

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

5

Final Grade: Reporter

Opp.: Russia

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

8

Final Grade: Opponent

Rev.: Thailand

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

7

Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 2 Problem no.: 5
 Juror: Ignacio Martinez Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Russia
Petr
Sibiryakov

5

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

-1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

0

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

5

Opp.: Kyrgyzstan
Andrey
Lauko

5

Physics ± 3

-1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

0

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

4

Rev.: Korea
Jinwoo Kim

5

Physics ± 3

+1

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

0

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

+1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Final Grade: Reviewer

7

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 2 Problem no.: 5
 Juror: SUE NAPIER Signature: S. Napier

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Russia
Nikolay 5
Sibirskiy 1 1/2

Physics ± 3 1 1/2
☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 -2
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reporter ± 1 0
☐ Quality of experimental technique(s)
☐ Structure
☐ Explanation of formulae and symbols
☐ Appropriate models, conformity of dimensions
☐ Slides, on-site experiments, audio, video, as appropriate
☐ References, proper citations of ideas and input of others
☐ Novelty of the report
☐ Contribution to the discussion

Final Grade: Reporter

Opp.: Angkor
Andreas 5
Leuko 1 1/2

Physics ± 3 1 1/2
☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 1 1/2
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Opponent ± 1 +1
☐ Response to the reporter's solution
☐ Shows the strong and weak points of the report
☐ Finds shortcomings or errors in the report
☐ Relevance of the questions
☐ Contribution to the discussion

Final Grade: Opponent

Rev.: Korea
Jiwoo 5
I.C.M. 1 1/2

Physics ± 3 1 1/2
☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 -2
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reviewer ± 1 0
☐ Provides a thorough review of report and discussion
☐ Expresses own opinion about topics presented or discussed
☐ Relevance of questions to both the reporter and the opponent
☐ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 2 Problem no.: 5
 Juror: Nasuman Signature: N.S.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Russia 5

Physics ± 3 -0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 +0.5

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

Reporter ± 1 +1

- ☒ Quality of experimental technique(s)
- ☒ Structure
- ☐ Explanation of formulae and symbols
- ☒ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

Final Grade: Reporter 6

Opp.: Hungary 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1 +1

- ☒ Response to the reporter's solution
- ☒ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

Final Grade: Opponent 4

Rev.: Korea 5

Physics ± 3 +0.5

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1 -1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1 +0.5

- ☒ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer 5

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 2 Problem no.: 5
 Juror: Bystajnski Signature: Bm

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Russia

5

Physics ± 3

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reporter ± 1

- ☒ Quality of experimental technique(s)
- ☐ Structure
- ☒ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☒ Novelty of the report
- ☐ Contribution to the discussion

0

Final Grade: Reporter

6

Opp.: Hungary

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

0

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

0

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☒ Contribution to the discussion

0

Final Grade: Opponent

5

Rev.: Korea

5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

+1

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 2 Problem no.: 5
 Juror: Urus Signature: G...

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

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- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
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- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
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- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Russia 5

Physics ± 3

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

Opp.: Russia 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

Rev.: Korea 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 2 Problem no.: 5

Juror: Ginika Exner Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
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- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Russia 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

7

Opp.: Hungary 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Korea 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 3 Problem no.: 17
 Juror: Igor MARTCHENKO Signature: [Signature]

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Hungary
Noel Plaster 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

Final Grade: Reporter

8

Opp.: Korea
[Signature] 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Russia
[Signature] 5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 3 Problem no.: 17
 Juror: SUE NAPIER Signature: S Napier

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Hungary
Plaszko 5

Physics ± 3 0
☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 +2
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reporter ± 1 +2
☐ Quality of experimental technique(s)
☐ Structure
☐ Explanation of formulae and symbols
☐ Appropriate models, conformity of dimensions
☐ Slides, on-site experiments, audio, video, as appropriate
☐ References, proper citations of ideas and input of others
☐ Novelty of the report
☐ Contribution to the discussion

Final Grade: Reporter

6

Opp.: Korea
Jiwoo Han 5

Physics ± 3 +2
☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 +1
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Opponent ± 1 +2
☐ Response to the reporter's solution
☐ Shows the strong and weak points of the report
☐ Finds shortcomings or errors in the report
☐ Relevance of the questions
☐ Contribution to the discussion

Final Grade: Opponent

7

Rev.: Russia
Vitali Matyunin 5

Physics ± 3 +1
☐ Correct and relevant physics
☐ Scientific approach
☐ Validity of conclusions
☐ Accurate answers

Presentation ± 1 +1
☐ Clear and understandable
☐ Appropriate manner
☐ Overall impression

Reviewer ± 1 +1
☐ Provides a thorough review of report and discussion
☐ Expresses own opinion about topics presented or discussed
☐ Relevance of questions to both the reporter and the opponent
☐ Draws attention to points missed by the reporter or the opponent

Final Grade: Reviewer

8

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 3 Problem no.: 17
 Juror: Name Signature: MS

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Hungary

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

-0.5

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

None

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☒ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☒ Contribution to the discussion

+0.5

Final Grade: Reporter

MS

Opp.: Korea

5

Physics ± 3

- ☐ Correct and relevant physics
- ☒ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

+0.5

Opponent ± 1

- ☒ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☒ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☒ Contribution to the discussion

+1

Final Grade: Opponent

8

Rev.: Rusata

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+0.5

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☒ Overall impression

+0.5

Reviewer ± 1

- ☒ Provides a thorough review of report and discussion
- ☒ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☒ Draws attention to points missed by the reporter or the opponent

+1

Final Grade: Reviewer

7

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Rejected: #16

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 3 Problem no.: 17
 Juror: Hajnyaski Signature: B. K.

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Hungary

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☒ Accurate answers

-1

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

0

Final Grade: Reporter

4

Opp.: Korea

5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+2

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Opponent ± 1

- ☒ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☒ Relevance of the questions
- ☐ Contribution to the discussion

-1

Final Grade: Opponent

6

Rev.: Russia

5

Physics ± 3

- ☒ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

+0.5

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

0

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☒ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

+0.5

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades – please do not bend

Final Grade: Reviewer

6

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 3 Problem no.: 16
 Juror: tho Signature: [Signature] 17

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: <u>Hungary</u>	Opp.: <u>Korea</u>	Rev.: <u>Russia</u>
<div>5</div>	<div>5</div>	<div>5</div>
Physics ± 3	Physics ± 3	Physics ± 3
<input type="checkbox"/> Correct and relevant physics	<input type="checkbox"/> Correct and relevant physics	<input type="checkbox"/> Correct and relevant physics
<input type="checkbox"/> Scientific approach	<input type="checkbox"/> Scientific approach	<input type="checkbox"/> Scientific approach
<input type="checkbox"/> Validity of conclusions	<input type="checkbox"/> Validity of conclusions	<input type="checkbox"/> Validity of conclusions
<input type="checkbox"/> Accurate answers	<input type="checkbox"/> Accurate answers	<input type="checkbox"/> Accurate answers
Presentation ± 1	Presentation ± 1	Presentation ± 1
<input type="checkbox"/> Clear and understandable	<input type="checkbox"/> Clear and understandable	<input type="checkbox"/> Clear and understandable
<input type="checkbox"/> Appropriate manner	<input type="checkbox"/> Appropriate manner	<input type="checkbox"/> Appropriate manner
<input type="checkbox"/> Overall impression	<input checked="" type="checkbox"/> Overall impression	<input type="checkbox"/> Overall impression
Reporter ± 1	Opponent ± 1	Reviewer ± 1
<input type="checkbox"/> Quality of experimental technique(s)	<input type="checkbox"/> Response to the reporter's solution	<input type="checkbox"/> Provides a thorough review of report and discussion
<input type="checkbox"/> Structure	<input type="checkbox"/> Shows the strong and weak points of the report	<input type="checkbox"/> Expresses own opinion about topics presented or discussed
<input type="checkbox"/> Explanation of formulae and symbols	<input type="checkbox"/> Finds shortcomings or errors in the report	<input type="checkbox"/> Relevance of questions to both the reporter and the opponent
<input type="checkbox"/> Appropriate models, conformity of dimensions	<input type="checkbox"/> Relevance of the questions	<input type="checkbox"/> Draws attention to points missed by the reporter or the opponent
<input type="checkbox"/> Slides, on-site experiments, audio, video, as appropriate	<input type="checkbox"/> Contribution to the discussion	
<input type="checkbox"/> References, proper citations of ideas and input of others		
<input type="checkbox"/> Novelty of the report		
<input type="checkbox"/> Contribution to the discussion		
Final Grade: Reporter <div>4</div>	Final Grade: Opponent <div>6</div>	Final Grade: Reviewer <div>6</div>

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Scoring Guidelines

Fight (Round no.): 2 Room: 9 Stage: 3 Problem no.: 18, 12
 Juror: Ginca Exner Signature: duj

A report should include:

- a presentation of the appropriate concepts, theories and principles of the problem
- an explanation of the observed phenomena
- an application of appropriate mathematics
- reasonable experimental technique to gather and record data (or demonstrate the phenomena if appropriate)
- linking of theoretical and experimental findings to draw suitable conclusions
- an attempt to communicate difficult or complex ideas in an effective and understandable manner

An opposition should show that:

- the opponent challenged the reporter's understanding of the presented concepts, theories and principles
- the opponent understood the appropriate mathematics presented
- the opponent critiqued the experimental technique used and questioned the validity of the data
- the opponent appreciated and highlighted the strengths and weaknesses of the report

A review should show that:

- the reviewer succeeded in giving an objective summary of the performances the reporter and opponent
- the reviewer appreciated the important aspects (especially the controversial ones)
- the reviewer's personal opinion was in evidence (not just superficial observations)
- such personal opinions were informative, non-trivial and demonstrated, where possible, the reviewer's understanding of concepts, theories, principles and appropriate mathematics used by the reporter and the opponent

- The grade for each of the three teams consists of a partial grade for physics, presentation and for their specific role.
- The reporter, opponent and reviewer each start with 5 points.
- Consider the following suggestions to add to or deduct from the initial 5 points.
- Select each partial grade from each section and write it in the corresponding box.
- Don't punish missing 'answers' when no questions were posed or not finding shortcomings if there were none to find.

Rep.: Hungary

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reporter ± 1

- ☐ Quality of experimental technique(s)
- ☐ Structure
- ☐ Explanation of formulae and symbols
- ☐ Appropriate models, conformity of dimensions
- ☐ Slides, on-site experiments, audio, video, as appropriate
- ☐ References, proper citations of ideas and input of others
- ☐ Novelty of the report
- ☐ Contribution to the discussion

5

Final Grade: Reporter

Opp.: Korea

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Opponent ± 1

- ☐ Response to the reporter's solution
- ☐ Shows the strong and weak points of the report
- ☐ Finds shortcomings or errors in the report
- ☐ Relevance of the questions
- ☐ Contribution to the discussion

5

Final Grade: Opponent

Rev.: Russia

5

Physics ± 3

- ☐ Correct and relevant physics
- ☐ Scientific approach
- ☐ Validity of conclusions
- ☐ Accurate answers

Presentation ± 1

- ☐ Clear and understandable
- ☐ Appropriate manner
- ☐ Overall impression

Reviewer ± 1

- ☐ Provides a thorough review of report and discussion
- ☐ Expresses own opinion about topics presented or discussed
- ☐ Relevance of questions to both the reporter and the opponent
- ☐ Draws attention to points missed by the reporter or the opponent

5

Final Grade: Reviewer

This sheet will be collected by the fight assistant, so we can scan it and archive your partial grades - please do not bend

Q

Round: 2 Room: 9 Fight Assistants:

Team	Stage 1			Stage 2			Stage 3			Stage 4		
	Korea Rep	Russia Opp	Hungary Rev	Russia Rep	Hungary Opp	Korea Rev	Hungary Rep	Korea Opp	Russia Rev	Rep	Opp	Rev
Juror												
Ilya Martchenko	5	6	5	5	4	7	8	7	8			
Susan Napier	6	6	6	5	7	5	6	7	8			
Narumon Suwanjandee	6	6	6	6	7	5	5	8	7			
Valiantsin Astashynski	6	6	5	6	5	7	4	6	6			
Uno Uno	7	7	6	6	6	6	4	6	6			
Ginka Exner	5	8	7	7	7	7	5	5	5			
Acting Team Member	Se Beom Lee	Vitalii Matunin	Abel Beregi	Nikolay Sibiryakov	András Lauko	Jiwoo Kim	Noel Plaszkó	Jiwoo Kim	Vitalii Matunin			
Rejected Problems	3 , 10			1			16					
Accepted Problem	15			5			17					

Signature Fight Assistant: Double-checked with Scoring Guidelines by second Fight Assistant (signature):