External Assessment Report 2009

<table>
<thead>
<tr>
<th>Subject</th>
<th>Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>Standard Grade</td>
</tr>
</tbody>
</table>

The statistics used in this report are pre-appeal.

This report provides information on the performance of candidates which it is hoped will be useful to teachers/lecturers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published question papers and marking instructions for the Examination.
Comments on candidate performance

General comments

Most markers and examiners thought that the examination was fair and balanced, and that it tested a wide range of Learning Outcomes from the Arrangements for Standard Grade Physics at both general and credit levels.

There was no evidence of lack of time.

All questions were accessible to well prepared candidates. The performance of most candidates in all of the units of the course was balanced.

Most candidates were well prepared for the examination and were able to attempt answers to all questions. However, there were some notable areas where some candidates did not seem to be well prepared in their knowledge and understanding of some of the Learning Outcomes described in the Arrangements. This lack of preparation was also reflected in the problem solving performance of some candidates at both general and credit levels.

Markers and examiners noted a maintained improvement in the selection of the appropriate relationship for numerical questions since the introduction of the Physics Data Booklet. However, where candidates were able to select and use the correct relationship to answer a question, some were unable to complete the answer because they gave the wrong unit or even omitted the unit in the final answer (at both levels), or, at credit level, because they gave an inappropriate number of significant figures in the final answer.

Centres and candidates are reminded that all of the Learning Outcomes in the Arrangements can be routinely tested in the external examination.

Conversion into appropriate units was a problem for some candidates e.g. GHz→Hz, km→m, mW→W, kΩ→Ω.

Areas in which candidates performed well

General Level:

Most candidates were successful in questions which involved selecting the appropriate relationship and calculating the final answer.

Examples include:

- Q10(a), (b) calculation of resistance and voltage
- Q12(a)(ii) calculation of wavelength
- Q15(b)(ii) calculation of acceleration

Most questions requiring the interpretation or completion of graphical information were well attempted.

Examples include:

- Q13(b)(i),(ii) select digital signal, draw amplified signal
- Q15(b)(i) complete a speed-time graph

Credit Level:

The performance of most candidates in questions testing their knowledge and understanding was good. As was the case at general level, candidates were mostly successful in the correct selection of relationship required to complete an answer requiring a calculation.
Examples include:

- Q1(a)(ii) wavelength of signal
- Q1(b) time for signal to travel
- Q2(c) calculate depth of sea bed – although some candidates failed to divide answer by two
- Q3(e) calculation of output power
- Q8(c)(ii) calculation of resistance
- Q10(b)(i) calculation of weight
- Q11(a) calculation of acceleration
- Q11(b) calculation of gravitational potential energy
- Q12(b)(i) calculation of total distance travelled
- Q12(b)(ii) calculation of average speed
- Q14(b) calculation of heat energy
- Q14(c)(ii) calculation of time to supply heat energy

Areas which candidates found demanding

General Level:

A significant number of candidates failed to demonstrate knowledge of the basic facts required to complete some answers.

Examples include:

- Q5 selection of digital device.
- Q9(c)(i),(ii) knowledge about mains supply – several d.c. instead of a.c and 60 Hz instead of 50 Hz
- Q10(d)(i)A&B location of energy transformation
- Q16(a) minimum required upward force

Some questions which required descriptive or explanatory responses were poorly attempted by some candidates. Responses were loose or imprecise, indicating a lack of preparation for these types of questions.

Examples include:

- Q7(c)(ii) purpose of a tuner.
- Q10(c)(i) describe how to show that continuity tester is working
- Q11(b) some loose descriptions-‘to see broken bones’
- Q11(c)(ii) explain use of gamma radiation
- Q14(c)(ii) explain the need for a series resistor

A few candidates were careless in their answers to graphical questions.

Examples include:

- Q8(b) some candidates failed to show frequency being doubled clearly

Credit Level:

Some candidates found some problem solving marks quite difficult to attain, particularly in extended questions worth three marks. This was usually caused by a failure to do a preliminary calculation before applying a relationship, or by failing to seek necessary data from the Data Sheet.

Examples include:

- Q10(b(ii) calculation of acceleration – some candidates failed to calculate the unbalanced force first
- Q13(c) calculation of power loss – some candidates failed to calculate the total resistance of the cable
- Q14(c)(i) calculation of latent heat energy – some candidates failed to obtain the value for I, from the Data Sheet
As previously stated, there were areas where some candidates did not seem to be well prepared in their knowledge and understanding of some of the Learning Outcomes described in the Arrangements. Examples include:

Q4(b)(i) purpose of commutator  
Q4(c)(ii) how to reverse direction of rotation.  
Q6(b) what is meant by refraction of light  
Q8(b) reduce time for LED to switch on – ambiguous answers used (smaller resistor/capacitor instead of smaller values of resistance/capacitance)  
Q11(b)(ii) some candidates failed to apply conservation of energy  
Q15(c) explanation of circular path/orbit

**Advice to centres for preparation of future candidates**

Centres and candidates are reminded that any of the Learning Outcomes in the Standard Grade Arrangements in Physics document may be tested in the examination. Candidates should be encouraged to consolidate their knowledge and skills for the entire course, e.g. by practising questions from past papers.

Candidates’ preparation for the examination could include repeated use of the Physics Data Booklet and the Data Sheet from the credit examination paper, when solving problems.

To help to reduce common mistakes, placing a particular emphasis on rehearsing the traditional areas which candidates find demanding would help improve their understanding and familiarity with the examination content. For example:

- Use of the Data Booklet in the routine selection of relationships required to solve problems.
- Use of a variety of questions requiring conversion of units,
- The use of the Data Sheet to extract information required to obtain answers to extended questions.
- The use of past papers to develop candidates’ ability to supply the range of answers required and to indicate the pace required during an examination.
Statistical information: update on Courses

<table>
<thead>
<tr>
<th>Number of resulted entries in 2008</th>
<th>15296</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of resulted entries in 2009</td>
<td>14780</td>
</tr>
</tbody>
</table>

Statistical Information: Performance of candidates

Distribution of overall awards

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>29.8%</td>
</tr>
<tr>
<td>Grade 2</td>
<td>26.0%</td>
</tr>
<tr>
<td>Grade 3</td>
<td>24.6%</td>
</tr>
<tr>
<td>Grade 4</td>
<td>8.5%</td>
</tr>
<tr>
<td>Grade 5</td>
<td>5.7%</td>
</tr>
<tr>
<td>Grade 6</td>
<td>4.1%</td>
</tr>
<tr>
<td>Grade 7</td>
<td>0.3%</td>
</tr>
<tr>
<td>No award</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

Grade boundaries for each assessable element in the subject included in the report

<table>
<thead>
<tr>
<th>Assessable Element</th>
<th>Credit Max Mark</th>
<th>Grade Boundaries</th>
<th>General Max Mark</th>
<th>Grade Boundaries</th>
<th>Foundation Max Mark</th>
<th>Grade Boundaries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>KU</td>
<td>50</td>
<td>34</td>
<td>25</td>
<td>40</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>PS</td>
<td>50</td>
<td>32</td>
<td>22</td>
<td>40</td>
<td>24</td>
<td>20</td>
</tr>
</tbody>
</table>