External Assessment Report 2009

Subject	**Physics**
Level	**Intermediate 2**

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

Feedback from markers, teachers and students indicated that the assessment was balanced in terms of curricular content and academic demand. It was considered to be fair and of suitable and similar standard to last year's paper.

Questions requiring candidates to perform calculations were answered well and equations were transposed accurately. However, candidates are still performing poorly in questions requiring definitions, explanations and descriptions of experimental techniques.

The paper was accessible to all candidates and there was no evidence of a lack of time.

Areas in which candidates performed well

In general, the multiple choice questions were answered well indicating that candidates had been prepared competently. The following multiple choice questions had high facility values: 1, 5, 9, 13, and 17. These questions involved problem solving skills and an understanding of basic knowledge.

In the written part of the paper, responses to the following questions were particularly good:

21 This was a straightforward introductory mechanics question involving potential and kinetic energies, electrical energy, power and current. However common mistakes arose from not converting kW to W and time into seconds.

22 Parts (a) and (b) covering acceleration and unbalanced force calculations were well attempted.

23 The calculations in this question on heat were answered well in parts (a), (b), and (c).

26 Usually questions on transformers pose problems for candidates but this question was well done. However candidates still try to assign units for gain (b) (ii).

27 Candidates performed well in this question on light, apart from the definition of 'refraction'. Marks were carelessly lost from incorrect conversion of the focal length of the lens and the incorrect substitution of 10^{-7} in calculating the frequency of light.

Areas which candidates found demanding

In the multiple choice section, question numbers 4, 7 and 10 were poorly done. These involved a projectile, latent heat and a series circuit question. Candidates found it difficult to select the correct statements from the information supplied.

In the written part of the paper, responses to the following questions posed difficulties for candidates:

22(c) Candidates found it difficult to understand how, and to explain why, the sledge came to rest.

23 Responses to this whole question were inadequate.
Descriptions of measuring instantaneous speed were careless and did not properly identify measurements required and necessary calculations as specified in the question.

Only a few candidates managed to calculate the vertical speed and drop of the pellet in the final parts of the question.

24(c)(ii) There were very few correct explanations as to why the time taken to make the ice was longer.

24 This question was poorly answered.
(a)(ii) Candidates were not aware of the significance of a straight line graph going through the origin.
(b)(ii) There was a poor understanding of how the smallest combined resistance could be achieved by combining resistors in parallel.

27 Whilst overall responses to this question were good – b (i) was poorly done. Most answers quoted the "bending of light" as the definition of refraction rather than-'the change of speed or wavelength of light when it moves from one medium to another'.
Many of the ray diagrams, showing light travelling along an optical fibre, failed to obey the law of reflection (approximately) and angles of incidence were often much smaller than the critical angle i.e. there were too many reflections in a particular length of fibre.

28 (a)(ii) Many responses failed to halve the time or distance between the object and the rear of the car.
(d)(i) Many responses failed to subtract the voltage across the LED from the supply voltage to enable them to calculate the value of the resistor.

29 (a) Experimental methods were poorly explained and described despite candidates having been given clear guidelines in the question asking for equipment, measurements and an explanation.

Advice to centres for preparation of future candidates

- Ensure that candidates know the appropriate definitions given in the content statements.
- Candidates tend to be poor in the 'describe and explain' questions. More opportunity could be given in class for candidates to explain basic concepts and experiments.
- Candidates should have more experience with graphs to enable a better understanding of their significance.
- When a candidate makes two (or more) attempts for the same part of the question, they must score through the part(s) which they do not wish to be considered by the marker.
- Candidates should practise using all the prefixes listed in the content statements for the course and be able to enter them into their calculators correctly. Also candidates should not attempt any unnecessary conversions e.g. kilograms into grams.
- Candidates should be prepared to complete ray diagrams using straight lines and the appropriate laws of light.
- Remind candidates that they will be penalised for incorrect use of equal signs e.g.-
$v^2 = 64 = 8$ m/s
- Remind candidates to include units in the final answers.

Statistical information: update on Courses

Number of resulted entries in 2008	3488

Number of resulted entries in 2009	3796

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark - 100				
A	35.2%	35.2%	1335	70
B	20.2%	55.4%	768	60
C	18.8%	74.2%	712	50
D	7.2%	81.3%	273	45
No award	18.7%	100.0%	708	-

General commentary on grade boundaries

- While SQA aims to set examinations and create marking instructions which will allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and a well prepared, very competent candidate to score at least 70% of the available marks (the notional A boundary), it is very challenging to get the standard on target every year, in every subject at every level.
- Each year SQA therefore holds a grade boundary meeting for each subject at each level where it brings together all the information available (statistical and judgemental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.
- The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- Where standards are comparable to previous years, similar grade boundaries are maintained.
- An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions, and the mix of questions are different. This is also the case for exams set in centres. If SQA has already altered a boundary in a particular year in say Higher Chemistry this does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related as they do not contain identical questions.
- SQA's main aim is to be fair to candidates across all subjects and all levels and maintain comparable standards across the years, even as arrangements evolve and change.