External Assessment Report 2010

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

The examination was widely recognised as a fair and balanced assessment. Questions were set in some interesting and novel contexts which tested fundamental principles and learning outcomes within the Arrangements for Intermediate 2 Physics. The paper combined a good mix of numerical and descriptive questions, and integration featured widely. There was little evidence of poorer performance in any one area, which indicated good preparation of candidates by presenting centres.

Questions requiring candidates to perform calculations were answered well, and equations were transposed accurately for the most part. However, candidates are still underperforming in questions requiring definitions, explanations and descriptions.

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. The following multiple-choice questions had very high facility values: 9, 14, 17, and 18. These mainly involved an understanding of basic knowledge.

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

- Question 21: this was a straightforward introductory mechanics question involving acceleration, distance, average speed, and weight. However, very few were able to calculate the total upward force in (iii).
- Question 22: parts (a), (b) and (d), covering momentum and electric current calculations, were very well attempted.
- Question 25: usually questions on transformers pose problems for candidates, but this question was well done apart from (a).
- Question 28: this question generated good responses, apart from (a)(ii), where it was obvious that many did not know what was meant by the period of a wave.
- Question 29 (c): the half-life calculation was done well.

Areas which candidates found demanding

In the multiple-choice section, Questions 5, 6, 10, 13 and 16 were poorly done. These covered latent heat, work done, mains supply, waves, and the power of a lens. Candidates found it difficult to select the appropriate information to answer the questions correctly. In Question 16, the most common option selected indicated that candidates had forgotten to convert the focal length into metres.

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

- Question 21 (e): the weight of the balloon was neglected in calculating the total upward force.
- Question 22 (b): many candidates did not attach arrows to the droplet. Gravity (on its own) was often quoted as the force acting downward.
- Question 23 (a): calculation of the change in temperature was done incorrectly.
- Question 24 (a): many failed to use the total resistance when calculating current.
- Question 25 (a): very few knew why AC should be used in transformers.
- Question 26 (c): as in previous years, candidates find it difficult to explain the operation of a MOSFET circuit. Many candidates quoted voltage as 'going through components'.
- Question 27 (b)(ii): the explanations of longitudinal and transverse waves were very poorly answered.
- Question 29 (b): in defining ionisation, many answers referred to the addition or removal of an electron without mentioning the atom.
- Question 30 (a): many candidates were not able to describe the function of the moderator and control rods.
- Question (b): very few were able to calculate the number of fission reactions.

Advice to centres for preparation of future candidates

Ensure that candidates know the appropriate definitions given in the content statements.

As in previous years, candidates tend to provide careless and minimal responses in the 'describe and explain' questions. More opportunities could be given in class for candidates to demonstrate understanding of basic concepts. Remind candidates that they must give full and accurate solutions, especially in answers where two marks are awarded. Answers must also be clear and legible.

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, they should not attempt any unnecessary conversions, eg kilograms into grams.

Remind candidates to include units in the final answers, and encourage them to check that they are the correct units. Weight was often answered in kg. Attention must be also given to the inappropriate rounding of numerical answers and the use of too many significant figures.

Statistical information: update on Courses

Number of resulted entries in 2009	3796
Number of resulted entries in 2010	3905

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	34.2%	34.2%	1334	69
B	21.1%	55.3%	825	59
C	19.0%	74.3%	743	50
D	8.3%	82.6%	325	45
No award	17.4%	100.0%	678	–

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, therefore, SQA 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 Head of Service 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.