Principal Assessor Report 2005

Assessment Panel:	**Physics**

Qualification area

Subject(s) and Level(s) Included in this report	**Physics Higher**

Statistical information: update

Number of resulted entries in 2004	9,286

Number of resulted entries in 2005	8,951

General comments re resulted entry numbers

There has been a decrease of 335 (3.6%) candidates at the pre-appeal stage.

Statistical Information: Performance of candidates

Distribution of awards including grade boundaries

Distribution of awards	%	Cum %	Number of candidates	Lowest mark
Maximum Mark- **90**	-	-	-	-
A	28.4	28.4	2,540	59
B	23.6	52.0	2,111	46
C	21.6	73.6	1,929	34
D	9.4	83.0	842	28
No award	17.0	100.0	1,529	-

General commentary on passmarks and grade boundaries

- While SQA aims to set examinations and create mark schemes which will allow a competent candidate to score a minimum 50% of the available marks (notional passmark) and a very well-prepared, very competent candidate to score at least 70%, it is almost impossible to get the standard absolutely on target every year, in every subject and level
- Each year we therefore hold a passmark meeting for each subject at each level where we bring together all the information available (statistical and judgmental). 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 senior management team at SQA
- We adjust the passmark downwards if there is evidence that we have set a slightly more demanding exam than usual, allowing the pass rate to be unaffected by this circumstance
- We adjust the passmark upwards if there is evidence that we have set a slightly less demanding exam than usual, allowing the pass rate to be unaffected by this circumstance
- Where the standard appears to be very similar to previous years, we maintain similar grade boundaries
- 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 are different. This is also the case for exams set in centres. And just because SQA has altered a boundary in a particular year in say Higher Chemistry 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
- Our main aim is to be fair to candidates across all subjects and all levels and maintain standards across the years, even as arrangements evolve and change.

Comments on any significant changes in distribution of awards/grade boundaries

Markers considered the 2005 Paper to be fair and to have a good coverage of the content.

The distribution of awards does not differ greatly from 2004.

The mean mark for Section A was 13.5, 1.4 marks higher than last year whereas the mean for Section B was 32.4, 2.1 marks lower, giving an overall decrease of 0.7 marks.

The lowest mark for a grade A was set at 59 (66%) which is 2 marks lower than that calculated from centre estimates.

The lowest mark for a grade C was set at 34 (38%) which is 5 marks lower than that calculated from centre estimates.

The grade boundaries for A, B and C at 66%, 51% and 38% are all below the notional boundaries and reflect the overall difficulty candidates had with the 2005 Paper.

Comments on candidate performance

General comments

Overall candidate performance was similar to that in 2004 although a number of markers commented that there seemed to be a larger number of less well-prepared candidates than in previous years.

Candidates found the qualitative responses to questions to be the most difficult. Calculations were generally performed to a good standard although responses to three mark calculations were significantly poorer than for two mark calculations. The quality of English was similar to that in previous years.

Areas of external assessment in which candidates performed well

Questions 1, 2, 5, 7, and 17 in the multiple-choice section of the paper were particularly well done.

Question 21 – Candidates performed well in (a) (i) (A) and (B).
Question 23 – The calculation of density in part (a) was generally well done.
Question 24 – Parts (a) (ii) and (b) (i) of this question were well done.
Question 25 – Most candidates, in part (b) (i) demonstrated good knowledge of finding the e.m.f. and calculating the internal resistance. In part (b) (ii) most candidates were able to show the variable resistor had a value of 15 Ω.
Question 26 – The calculations for parts (b) (i) the energy stored in the capacitor and (b) (ii) the maximum current in the resistor were well done by most candidates.
Question 30 – This question was well done by the majority of candidates.

Areas of external assessment in which candidates had difficulty

Question 21 – In part (a) (ii) a large number of candidates failed to realise that they had to work out the speed of the vehicle at Q before using an appropriate equation of motion. In part (b) (ii) many candidates had difficulty in explaining the sequence of events to switch on the MOSFET.
Question 22 – In part (a) (i) some candidates used sine instead of cosine and a large number had an incorrect number of significant figures. In (a) (ii) few candidates realised that the unbalanced force acting on the capsule had to be calculated. Part (a) (iii) a significant number of candidates did not realise that the force exerted by the cords would decrease. Part (b) confused most candidates.
Question 23 – In part (c) a significant number of candidates did not make reference to the resistance of the water in their answer. In part (d) many candidates used imprecise language such as “the acceleration slows down” in their answer.
Question 24 – In part (b) (ii) many candidates drew a sketch graph for increasing change in resistance only.
Question 26 – In part (a) (iii) most candidates used the voltmeter reading (voltage across the resistor) in the calculation of the charge stored by the capacitor.
Question 27 – Candidates found part (b) (ii) challenging.
Question 29 – In part (b) (ii) few candidates understood the concept involved.

Recommendations

Feedback to centres

- Candidates should be encouraged to read questions carefully.
- Most candidates require practice in questions requiring a description and an explanation.
- Candidates must be careful that they do not use imprecise language during an explanation. For example: 'acceleration decreases' rather than 'acceleration slows', 'the time to charge is shorter' rather than 'the time to charge is faster' and 'decrease the value of the resistor' rather than 'use a smaller resistor'.
- The use of arrow symbols in descriptive questions should be discouraged. For example: 'as the temperature increases the kinetic energy increases …' instead of 'as the temperature ↑ the kinetic energy ↑…'
- The importance of being able to give the definitions of quantities such as e.m.f. must be stressed.
- In numerical calculations candidates should use the number of allocated marks as a guide to the amount of calculation required. For example if a question has three marks allocated then there are likely to be more 'steps' than in a two mark calculation. See 2005 question 26 (a) (iii) and (b) (i).
- Where a question requires a calculation in order to verify the value of a quantity the calculation must show all the steps in the calculation and the final value.
- Candidates should use SI units e.g. 0.016 seconds is the same as 0.016 s but it would be incorrect to write as 0.016 secs.
- The skill of calculating the path of a ray of light through a transparent prism with or without total internal reflection requires to be practised.
- When two or more attempts have been made for the same part of a question, candidates must score through unwanted part(s) of an answer they do not wish to be considered.
- Candidates should show the origin and label the axes on sketch graphs.