External Assessment Report 2013

Subject(s)	Physics
Level(s)	Standard Grade

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 majority of markers thought that the examination was fair and balanced, with questions set at the appropriate level. They also commented that the examination tested a wide range of Learning Outcomes from the Arrangements for Standard Grade Physics, at both General and Credit level.

In addition, markers commented on the range and variety of question types asked at both levels, and the accessibility of all questions to well prepared and careful candidates. There was also favourable comment on the balanced performance across all course Units by well-prepared candidates.

Markers commented that, for many candidates, responses to knowledge and understanding questions were better than those for problem solving questions.

Although many candidates did seem to be well prepared for the examination, there was evidence of some candidates not having applied sufficient effort to retain knowledge and facts, and not to have sufficiently practised their problem solving skills.

At both General and Credit levels, there was no evidence of candidates rushing or having insufficient time to finish.

Careless mistakes or omissions in responses were common. As in previous years, these have been consistently highlighted in these reports (eg missing or wrong unit in the final answer to numerical problems).

For questions requiring explanations, some candidates were unable to give explanations that were clear and unambiguous, or their explanations were too loose, or gave additional contradictory information, which led to marks for the answer being withheld.

Some markers commented that, at Credit level, the selection of several extended problem solving questions proved to be challenging for some candidates, particularly questions that required more than one calculation to be carried out to reach a final answer. The failure to complete all stages of the calculation caused some candidates to achieve only partial marks for several of these extended questions. For example, Q1(d) required two signal times to be calculated, then subtracted to achieve the time delay — some candidates failed to complete the subtraction; Q2(b)(iii) required a total distance to be calculated then halved to obtain the distance to the flaw — some candidates failed to divide by two; Q4(b) — some candidates failed to calculate the voltage across the variable resistor *before* applying Ohm's Law to obtain the current in the circuit. The grade boundaries for problem-solving were reduced to account for this increased level of demand, so that candidates for this year's examination were not disadvantaged in comparison to previous years.

Since the introduction of the Physics Data Booklet, there has been continued improvement in the selection of the appropriate relationship for numerical questions at both levels.

Areas in which candidates performed well

General

Q1	Function of double insulation.
Q2	Identification of atomic particles.
Q4	Identification of non-renewable energy sources.
Q6(d)	Calculation of wavespeed.
Q7(c)(i)	Identification of waveband.
Q8(a)	Calculation of power.
Q8(b)(i)	Calculation of resistance.
Q9(a)(i)	Stating mains voltage.
Q9(a)(ii)	Identifying flex wires and colours.
Q10(c)(i)&(ii)	Identifying radiation.
Q11(a)(i)	Analysis of sound travel.
12(a)(i)	Identify OR gate.
13(b)(i)	Calculation of resistance.
14(a)	Calculation of weight.
Q15(a)	Calculation of average speed.
Q17(a)(i)A	Interpretation of temperature–time graph.
Q18(a)(i)–(iii)	Analysis of table.
Q18(b)	Completion of passage.

Credit

Q1(c)	Transmission speed of radio and light signals.
Q2(b)(ii)	Selection of speed of sound in aluminium.
Q3(a)	Identification of parallel circuit.
Q3(b)	Calculation of current in heating mat.
Q7(a)	Identification of logic gate.
Q8(c)(i)	Calculation of output power.
Q10(a)	Calculation of potential energy.
Q10(d)	Sketch projectile path.
Q12(c)(i)	State renewable energy source.
Q14(a)	Analysis of orbital height.

Areas which candidates found demanding

General

Q12(b)	Function of NOT gate in logic circuit.
Q17(a)(ii)	Explanation of temperature fall.
Q17(b)	Explanation of container insulation.
Q18(c)(ii)	Purpose of objective lens.

Credit

Q1(b)	Description of optical fibre.
Q1(d)	Calculation of time delay.
Q2(b)(i)	Analysis of graph to obtain time interval.
Q3(d)	Explanation of use of ohmmeter.
Q4(b)	Calculation of current.
Q5(b)(i)	Description of short sight.

Q6(a)	Explanation of tracer.
Q6(c)(i)&(ii)	Operation of film badge.
Q9(a)	Definition of average speed.
Q10(c)	Calculation of speed at end of slide.
Q11(b)	Calculate the current in the primary coil.
Q13(b)(ii)	Calculate rocket acceleration.
Q13(d)(i)	Explanation of freefall.

Advice to centres for preparation of future candidates

Centres and candidates are reminded that all of the Outcomes in the Standard Grade Arrangements in Physics document may be tested in the examination, and that candidates should be encouraged to consolidate their knowledge and problem solving skills for the entire Course.

Some questions, especially at credit level, test candidates' ability to analyse and solve questions with more complex scenarios and data. Such questions may require more than one stage of calculation to achieve an answer. Candidates should have the opportunity to practise examples of such questions.

Questions requiring explanations or definitions should also be rehearsed frequently to foster appropriate use of physics language.

To encourage familiarity with the required relationships, candidates' preparation for the examinations should include repeated, routine classroom use of the Physics Data Booklet and the Data Sheet from the Credit level examination paper when solving problems.

Candidates should take care to read all questions carefully and to ensure that their answers are appropriate and sufficient to gain full marks.

Care should be taken where numerical answers require units to be converted before calculating the final answer.

Data and values for answers which require to be extracted from graphs or tables should be carefully checked before use in a relationship.

Centres should also try to accustom candidates to setting out their working clearly for questions requiring calculations, to allow markers to apportion partial marks to the answer.

The marking instructions published on SQA's website illustrate how marks are apportioned to responses.

Statistical information: update on Courses

STANDARD GRADE

Number of resulted entries in 2012	14227

Number of resulted entries in 2013	14178

Statistical Information: Performance of candidates

Distribution of overall awards

Grade 1	32.1%
Grade 2	26.3%
Grade 3	22.2%
Grade 4	7.6%
Grade 5	6.1%
Grade 6	4.7%
Grade 7	0.2%
No award	0.9%

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

Assessable Element	Credit Max Mark	Grade Boundaries		General Max Mark	Grade Boundaries		Foundation Max Mark	Grade Boundaries	
		1	2		3	4		5	6
KU	50	36	29	40	26	19	40	15	-
PS	50	27	15	40	20	16	40	15	-

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.