External Assessment Report 2012

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

Most Markers thought that the examination was of appropriate standard and level, and covered a comprehensive range of Outcomes from the Arrangements at both General and Credit levels.

There was favourable comment on the fairness, balance, range and customary variety of question types asked at both levels.

These included multiple-choice questions (at General level), numerical direct-answer and short-answer questions and extended-answer questions at both General and Credit levels.

Many Markers commented on the accessibility of all questions to well-prepared candidates.

Markers also commented on the balanced performance across all of the Course Units by well-prepared candidates.

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

Markers also indicated that the majority of candidates selected appropriate relationships for questions requiring calculations, and some attributed this to familiarity with the use of the Physics Data Booklet. However, it was noted that a small minority of candidates consistently selected the wrong relationships, indicating a lack of preparation or routine use of the Data Booklet in class.

At Credit and General level, there was evidence of many candidates being well prepared in their knowledge and understanding of the Course content, showing good recall of facts and the ability to apply their knowledge. These candidates also demonstrated good problem solving ability and were evidently well practised in these skills.

However, there was evidence of a number of candidates being poorly prepared at both levels in their problem solving skills. At General level, this was illustrated by some candidates being unable to solve problems relating to familiar contexts, eg identifying the effect of freefall (Q5), identifying the reduction in energy as a wave progresses (Q 7 (c)), identifying the switching effect of a transistor to light a warning lamp (Q13 (a) (iii)).

At Credit level, some candidates' poor problem solving skills were also apparent in their answers to some questions. Often, failure to read questions carefully resulted in inappropriate answers being given, eg a thermometer quoted as being a suitable detector of infra-red radiation to control a toy helicopter (Q4 (a)). Some questions requiring explanations did not attract full marks because of 'loose' language being used, eg use a 'bigger resistor' instead of 'increase the resistance' to lower the frequency of a clock pulse generator (Q8 (c)).

Areas in which candidates performed well

General level:

Question 1	Function of tuner
Question 2	Reflection of light rays
Question 3	Identification of OR gate symbol
Question 6 (all)	Energy changes and waveforms
Question 7 (b)	Calculation of wavespeed
Question 8 (a)	Use of Ohm's law to determine resistance.
Question 9 (c)	Calculation of power dissipated in lamp
Question 10 (a)	Labelling of atom
Question 10 (b) (i)	Identifying radiation
Question 10 (b) (ii)	Identifying radiation
Question 11 (b) (ii)	Light transmission in optical fibres
Question 12 (a)	Identify output device
Question 13 (b)	Identify digital output devices
Question 14 (b)	Calculation of distance travelled
Question 17(a)	Identification of renewable and non-renewable energy sources
Question 17(c)(i)	Calculation of power stations required

Credit level:

Question 1 (b) (ii)	Use of wave equation to calculate wavelength
Question 1 (c) (i)	Completion of curved reflector diagram
Question 6 (d)	Calculation of half-life
Question (7) (b) (iii)	Calculation of voltage using power relationship
Question 9 (a)	Calculation of weight
Question 10 (a)	Calculation of acceleration
Question 10 (c) (i)	Reducing air resistance
Question 14 (b)	Calculation of light year distance
Question 15 (b) (i)	Calculation of weight of astronaut
Question 15 (b) (ii)	Identification of mass of astronaut

Areas which candidates found demanding

General level:

Question 5	Objects in freefall
Question 7 (c)	Wave energy transmission
Question 9 (b)	Efficiency of discharge lamp
Question 11 (a) (ii)	Identifying uses of different radiations
Question 13 (a) (i)	Function of a thermistor
Question 13 (a) (ii)	Function of a transistor
Question 16 (b) (ii)	Explanation of heat loss
Question 17 (b)	Energy transformation in boiler
Question 19 (b) (ii)	Calculation of unbalanced force

Credit level:

Question 1 (c) (ii)	Explanation of size of curved reflector on signal
Question 3 (b) (ii)(A)	Resistance in parallel analysis
Question 3 (b) (ii)(B)	Resistance in parallel analysis
Question 4 (a)	Appropriate type of IR detector
Question 4 (b) (i)	Function of brushes in d.c. motor
Question 4 (b) (iii)(A)	Differences between simple and commercial d.c. motors
Question 4 (b) (iii)(B)	Differences between simple and commercial d.c. motors
Question 6 (a)	Use of radiation to detect faults in metal
Question 6 (b) (ii)	Selection of appropriate radioactive source from table
Question 8 (a) (i)	Drawing LED symbol in circuit in correct orientation
Question 8 (b)	Explanation of clock pulse generator
Question 8 (c)	Changing frequency of clock pulse generator
Question 9 (d) (i)	Conversion of E_{p} into E_{k} and calculation of final speed
Question 12 (a) (ii)	Explanation of change of state
Question 13 (c)	Explanation of energy loss
Question 14 (d)	Explanation of different detectors to detect signals in space
Question 15 (a) (i)	Explanation of gravitational field strength
Question 15 (c) (ii)	Disadvantages of solar cells

Advice to centres for preparation of future candidates

It is important for candidates to be well prepared and to have a good knowledge of the Course content. Centres and candidates are reminded that all of the Outcomes in the Arrangements can be routinely tested in the external examination.

The routine use of past papers and marking instructions to become familiar with the type of physics language and expressions used at each level would help candidates to construct their responses to both knowledge and understanding and problem solving questions.

Candidates should take care to read all questions carefully and to ensure that their answers are appropriate and sufficient to gain full marks, particularly with questions requiring explanations or descriptions.

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 set 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 the 'standard 2 Mark' type of question, and how marks are apportioned to responses.

Statistical information: update on Courses

STANDARD GRADE

Number of resulted entries in 2011	14,442

Number of resulted entries in 2012	14,227

Statistical Information: performance of candidates

Distribution of overall awards

Grade 1	31.1%
Grade 2	27.8%
Grade 3	23.4%
Grade 4	7.1%
Grade 5	5.1%
Grade 6	4.6%
Grade 7	0.3%
No award	0.6%

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	34	24	40	28	22	40	17	n/a
PS	50	31	20	40	24	20	40	17	n/a