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General Certificate of Secondary Education

Additional Science 4463 / Physics 4451

PHY2F Unit Physics 2

Report on the Examination

2010 examination - January series

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Additional Science / Physics
Foundation Tier PHY2F

General

Questions 1 to 5 were low demand, targeting grades E, F and G. Questions 6 and 7 were standard demand, targeting grades C and D.

There was no evidence of candidates having too little time to finish.

Candidates would be well advised to read the questions carefully to ensure that they are answering the questions that are set.

Candidates should also be encouraged to note the number of marks for each part question, shown in brackets, to ensure that their answers to the question contain the same number of points to enable access to the maximum mark.

Question 1 (Low Demand)

(a) Virtually all candidates gave the correct answer**.**

(b) This question was answered well by the majority of the candidates. However, it was worrying to note that even though candidates are advised that calculators may be used, a significant number of candidates added 18 and 6 to give answers of 23 and 25.

(c) There were very few correct answers given.

(d) Most candidates answered correctly. Incorrect responses were principally in terms of division of 6 volts by 0.25 amps.

Question 2 (Low Demand)

(a) The majority of candidates scored all 3 marks.

(b) The majority of the candidates chose the refuelling of an aircraft as being potentially hazardous due to a build up of static charge. Many candidates were then aware of the possibility of a spark igniting the flammable fuel. However, after ticking the correct situation, a significant number of candidates thought the danger lay in the form of electrocution of the ground staff or passengers.

Question 3 (Low Demand)

(a) This question was answered well with a majority of the candidates achieving both marks. However, there were some responses which indicated that candidates had interpreted ‘m/s’ as being momentum per second. Some candidates thought that **R** had the most momentum because it was in front.

(b) (i) Most candidates were able to multiply the mass by the velocity correctly. However, a significant minority of candidates substituted the numbers correctly but seemed not to have a calculator to enable them to give the correct answer.

(b) (ii) The majority of candidates responded correctly with errors being equally split between the two wrong answers provided. A few candidates had unfortunately tried to split the correctly paired unit circling only either kg or m/s.

(c) (i) This question was answered well with most candidates responding in terms of an increase in reaction time although some incorrect responses were clearly directed towards distance, rather than time.

(c) (ii) This question was poorly answered mainly due to candidates not answering the question set ie, what happens to braking distances in wet conditions. Candidates wrote excellent responses in terms of aquaplaning, skidding, lack of traction, wet brakes, the need to brake earlier, the need for less braking force, the increased possibility of accidents, the need to drive slower, etc. However, these responses failed to address the question.

Question 4 (Low Demand)

(a) (i) Most candidates scored 1 mark but few candidates scored both. A common error was not to realise that the number of electrons and the number of protons would be the same.

(a) (ii) Few candidates scored both marks, although the correct mass number of seven was often chosen. Many candidates did not obtain the second mark due to thinking that the nucleus contained electrons. In total half of the candidates scored zero.

(b) The most popular answer was 'an isotope'. Less than half of the candidates chose the correct answer 'an ion'.

(c) (i) & (ii) Few candidates achieved both marks. Many candidates gave the answer the 'same as' and considered that the alpha particle would join with the polonium. Too many candidates responded by using 'it' as the start of their response, producing ambiguous statements regarding the relative masses of radon and polonium.

Question 5 (Low Demand)

(a) Most candidates chose the correct answer.

(b) Most candidates were able to achieve 2 marks by stating the relationship between the light intensity and LDR resistance. However, from the brevity of the responses, it seemed that candidates may have disadvantaged themselves by not noting that the mark allocation for this part question was 3 marks and that the question specifically asked for a **detailed** description of the relationship illustrated in the graph.

(c) (i) & (ii) There was an even spread of candidates choosing from the three options offered in part (c)(i), with very few candidates with the correct answer then giving a valid reason for their choice . Many of the candidates achieved credit in part (c)(ii) by stating that the resistance of the LDR increased because of the fall in light intensity, having previously indicated that they thought the current would increase.

(d) Most candidates gave the correct answer.

Question 6 (Standard Demand)

(a) Many candidates were able to perform the calculation correctly but few candidates were able to supply the correct unit. There were many instances where the candidates substituted 1.2 m/s^2 into the equation and then went on to either use 1.2^2 or 1.2 X 2 in their calculation.

(b) (i) It was disappointing that very few candidates gave the correct answer to this question, the majority of the incorrect answers being mass, acceleration, momentum and time.

(b) (ii) Again there were very few correct answers. Most candidates thought that the use of a line graph was to improve the presentational appearance of the data and to make the data easier to understand.

(b) (iii) Most candidates scored at least 2 marks, generally for choosing **C** and then stating that the forces were equal or the arrows were the same length. A significant minority of candidates chose **B** because the resultant force forwards would be the greatest so the cyclist would be going the fastest ie, 9 m/s.

Question 7 (Standard Demand)

(a) (i) This was not answered well. The principal errors were candidates responding in terms of atoms, rather than nuclei, and descriptions based on fission processes.

(a) (ii) Few candidates were aware of the site of nuclear fusion reactions, with common misconceptions placing this process within volcanoes or the atmosphere.

(b) (i) Just under half of the candidates were able to state why nuclear fusion reactors are not used to produce electricity from the information given. Many incorrect responses were in terms of vague statements involving doubts about the safety aspects of nuclear power in general.

(b) (ii) Unfortunately, most candidates suggested that the **sole** reason for the continuing search for sustainable nuclear fusion in a reactor was due to issues involving fossil fuels and carbon dioxide and did not receive credit.

(c) (i) This question which assessed candidates ability to comprehend issues from 'How Science Works' was very poorly answered. The majority of the responses dwelled on either, experimental conditions or reporting issues, rather than the failure of science community to be able to replicate the claimed creation of 'cold fusion' described in the question stem.

(c) (ii) This part question was answered well by most candidates who exhibited a scepticism towards the total validity of articles in daily newspapers, and the motives of their writers.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.