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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Additional Science 4463 / Physics 4451

PHY2F Unit Physics 2

Report on the Examination

2009 examination - January series

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Dr Michael Cresswell Director General.

Physics
Foundation Tier PHY2F

General

Questions 1 to 6 were low demand, targeting grades E, F and G. Questions 7 and 8 were standard demand, targeting grades C and D.

The majority of candidates attempted all parts of all questions, suggesting that time was not a problem in completing the paper.

The standard of handwriting was generally good. However, some candidates would clearly benefit from having a scribe assigned to them if they are eligible for such. Candidates should be encouraged to use a black pen, and to write their answers within the allocated space. If they wish to use continuation sheets, they should clearly indicate that they have done so.

The standard of numeracy was varied. Many candidates could substitute the correct numbers into an equation that they were given, but could then not complete the arithmetic correctly. Some candidates probably need reminding that they should take a calculator into the examination.

Question 1 ***(Low Demand)***

This question was accessible to all candidates with most showing a good understanding of these key processes. The majority of candidates scored three or four marks.

Question 2 ***(Low Demand)***

(a) It was disappointing to see how few candidates knew the basic details about the electricity supply that they use every day. Only about a third of candidates scored both marks.

(b)(i) In terms of the safety issues concerned with the use of mains electricity it is disquieting that many candidates are unaware of where and when an earth wire should be fitted to domestic appliances. Although many incorrect responses from the candidates were in terms of insulation issues within the cable, there were also many answers that assumed that because a UK standard square pin plug had an earth pin, that the appliance would be safe no matter what the casing of the appliance was made of. There were also a number of candidates who thought that the fact that the mains supply was from the UK obviated the need for earthing or double insulation.

(b)(ii) The vast majority of candidates were able to identify copper.

Question 3 ***(Low Demand)***

(a)(i) & (ii) The majority of candidates were able to show an understanding of electrostatic attraction and repulsion.

(b)(i) The majority of candidates noted the type of danger which the situation could produce but fewer identified that the static charge built up could produce a spark to

initiate a fire. Some candidates talked themselves out of the spark mark by positively disassociating the spark from the static electricity.

(b)(ii) The majority of candidates understood the reason for an earthing wire.

Question 4 ***(Low Demand)***

(a) It is surprising that many candidates were unable to identify the voltmeter as being in parallel. More surprising were the candidates that wrote the name of a component not shown in the diagram.

(b)(i) Most candidates identified the variable resistor.

(b)(ii) It was pleasing to see that most candidates understood the term range.

(b)(iii) The majority of candidates were able to select the appropriate values from the table of data, substitute the numbers into the equation and correctly calculate the answer.

(b) Only a minority of candidates were able to correctly identify what happens to the resistance of a lamp as the temperature increases.

Question 5 ***(Low Demand)***

(a)(i) Most candidates identified the correct proportion of background radiation from the pie chart.

(a)(ii) Of those candidates that scored this mark, most got it from 'eating food' rather than 'breathing in radon'. A significant number of candidates did not gain any credit as they simply listed all sources of radioactivity given in the pie chart.

(b) Although it was clearly indicated that three marks were available for this part of the question, many candidates simply stated their choice of the village which received the greater amount of cosmic rays, without providing a calculation as requested. Once again, there were clear indications that many candidates knew what calculations they needed to do to provide a numerical difference in the levels of radiation, but produced incorrect solutions to a simple division.

Question 6 ***(Low Demand)***

(a)(i) The majority of candidates correctly substituted the data into the equation and calculated a correct answer.

(a)(ii) This was generally answered well. Unfortunately, a number of candidates chose to draw several arrows rather than the requested single arrow.

(b) This part of the question was answered well but there were some instances where candidates had given the momentum as 900 then explained the reason by substituting numerical values for the mass and velocity and presented the equation '900 × 0 = 900'.

Question 7 ***(Standard Demand)***

(a) Many candidates made this question more difficult than intended and did not link the direction of travel with the resultant force.

(b) Many candidates realised that the different kinetic energies possessed by the passengers at the bottom of the slope was due to differing body masses. However some went on to give another incorrect factor such as the position occupied on the train.

(c)(i) Most candidates were able to complete this calculation correctly.

(c)(ii) The majority of candidates scored both marks. Many that did not scored 1 mark by calculating the weight of the passenger at rest.

Question 8 ***(Standard Demand)***

(a)(i) This was well answered with most candidates gaining both marks.

(a)(ii) It is surprising that only just over 50 % of the candidates knew the unit of acceleration.

(a)(iii) For a standard piece of recall it was surprising that only 50 % of candidates scored a mark.

(a)(iv) Less than 50 % of candidates drew the correct line and gained 2 marks.
Many candidates did not take into account the final velocity of 9 m/s.
Others did not relate the idea of constant acceleration to a straight line.

(b)(i) Candidates that chose the correct shoe of the three on test often gave a suitable reason for their choice to achieve 2 marks, but then failed to appreciate that this shoe was the best on all of the listed types of surface.
However nearly 50% of candidates were unable to interpret the bar chart correctly and chose either A or C.

(b)(ii) Most correct answers were in terms of human variability but many candidates mentioned the robot's consistency. A significant number of candidates did not recognize the importance of the word 'reliable' and answered in terms of sensor accuracy.

Mark ranges and award of grades

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