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Additional Science / Physics PH2FP

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Unit: Physics 2

Report on the Examination

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General

Questions 1 to 7 were low demand, targeting grades E, F and G. Questions 8 and 9 were standard demand, targeting grades C and D.

There was no evidence that students ran out of time, the majority of students attempted all part questions.

In questions requiring a calculation there seemed to be fewer students than in the past without access to a calculator. However many students still fail to take notice of the instruction to show working out. This has often resulted in a student who fails to complete the arithmetic correctly also failing to gain the mark for a correct method. Students should be encouraged to write down the equation and show the substitution.

Question 1 (Low demand)

(a) Just under two thirds of students answered this correctly.

(b) (i) Approximately two thirds of students gained both marks.

(b) (ii) Most students correctly stated that the BASE jumper slowed down. The reason was not well expressed. Many students thought that an increase in upthrust was sufficient to slow the BASE jumper whilst others said that the 'parachute slows the acceleration', implying that the BASE jumper continues to accelerate.

Question 2 (Low demand)

(a) Just under two thirds of students correctly identified the two sources. X-rays was a commonly given incorrect answer.

(b) (i) Just under two thirds of students gained this mark.

(b) (ii) Most students were able to correctly calculate the mean value.

(b) (iii) Only the more able students understood that the background count needed to be subtracted from 159. Many students gave the answer as 159 having ignored the background value.

(b) (iv) Just over half of students recognised that gamma was being emitted from the source, but few could give a valid explanation for this. A significant number of students simply wrote about the relative penetrating power of alpha, beta and gamma, with many of these students thinking that the gamma rays could pass through the actual magnets. The more able students explained that gamma rays were not deflected by the magnetic field, but only a few stated that the count had stayed the same.

(c) Nearly two thirds of the students gained this mark. Most of these gave an answer in terms of lead absorbing radiation. A common error was to say that the lead stopped the source from getting out.

(d) Just under half of the students identified the correct answer.

Question 3 (Low demand)

(a) A large proportion of the students provided the correct answer of 25 ohms. The most common incorrect response was 5 ohms, achieved by subtracting the numerical values of the resistors.

(b) (i) Almost half of students gained both marks, with very few gaining one mark. Common incorrect answers were achieved by multiplying or dividing the answer to part (a) by 6.

(b) (ii) Perhaps surprisingly, only just over half of the students knew that the two ammeters would have the same reading.

Question 4 (Low demand)

(a) (i) Only half of the students were able to select the correct value for frequency.

(a) (ii) Most students could identify the power correctly.

(b) The majority of students were able to score two marks by selecting the correct equation and calculating the current. However, only a third of students gave the correct unit. Many students failed to either write a unit in the answer space or indicate a choice by circling one of the units in the list.

(c) Two thirds of students gained one mark by giving a correct pattern linking the time and charge. However very few went on to score both marks by stating that the relationship between the variables was directly proportional.

Question 5 (Low demand)

(a) (i) Just over half of students gained both marks.

(a) (ii) Many students tended to answer the question in terms of static charge rather than describing the forces as asked. About half of the students gained one mark for stating that the forces were equal in size or that they repelled, this being taken to mean that they act in opposite directions. Very few students made two valid points.

(b) The majority of students gained this mark.

Question 6 (Low demand)

(a) A small number of students gained both marks. Two thirds of students gained one mark.

(b) (i) Over three quarters of the students gained at least one mark for selecting the correct part of the graph, nearly half gained both marks. However there were a significant minority of students that ticked two boxes in response to the first part, indicating a weak examination technique.

(b) (ii) This was well done by most students. However a minority could either not complete a correct substitution or failed to show any equation or substitution but simply gave an incorrect numerical answer.

Question 7 (Low demand)

(a) This was very poorly answered. Few students were able to link the diagram of the atom and the question to suggest that the neutrons shown in the diagram were discovered in 1932. Many students gave answers in terms of technology improvements and were under the misconception that it became possible to see the subatomic parts of an atom.

(b) This part was better answered with over half of students gaining both marks.

Question 8 (Standard demand)

(a) Most students gave a correct answer. The only common incorrect responses seen were gravitational potential and gravitational potential energy.

(b) This was well answered with most students gaining at least two marks. Most students identified that the car was accelerating and that the distance between the oil drops was increasing. Fewer students appreciated that the oil drops falling at regular time intervals was also relevant to confirming that the speed was increasing.

(c) (i) Over half of the students gave a relevant factor. Students failing to gain the mark usually gave thinking time / distance or a factor that affects thinking distance.

(c) (ii) Very few students were able to complete all the steps required in order to gain all three marks. Many students failed to change the 3 kN value to 3000 N, but some of these students went on to give an answer of 75 with the unit kJ and so did score full marks. However it was more common for the answer 75 to have no unit attached or an incorrect one, N/m being common.

Question 9 (Standard demand)

(a) Very few students gained this mark. Most responses did not have any reference to forces or that the forces would be balanced.

(b) (i) This was well answered with the majority of the students being able to identify the relationship between the relative mass of the star and the estimated time.

(b) (ii) This was poorly answered with many vague responses in terms of stars being ‘different’.

(b) (iii) Just over half of the students gained one mark for correctly choosing ‘faster than’. However these students often went on to simply give a repetition of the question as the explanation. Few students referred explicitly to the time spent in the main sequence, instead using terms like ‘its life is shorter’.

(c) This was very poorly answered with a significant minority of students scoring zero. A small amount failed to attempt the question. The better students knew the stages that a large star passes through after the main sequence period but were often unable to give a description of what happens to a star. Simple statements such as 'it expands to give a red supergiant' were sufficient to gain some credit. A significant number of students described the life cycle up to the main sequence period whilst others described the lifecycle of the Sun. The vast majority of the students seemed to simply put down everything they could think of in a totally random order. Many students were very creative, with new types of stars being named, black holes forming new stars and the complete life cycle being described in terms of a butterfly!

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

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