



**General Certificate of Secondary Education**

**Additional Science 4463 /  
Physics 4451**

**PHY2F      Unit Physics 2**

**Report on the Examination**

*2008 examination - June series*

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# Physics

## Foundation Tier PHY2F

### General

Most candidates attempted each part of each question.

In calculations it is important that candidates show their working clearly.

When an arithmetic error is made candidates can gain credit for a correct method. Candidates should also know that numerical answers are usually realistic figures and therefore should appreciate whether their answer is realistic or not.

### Question 1 (*Low Demand*)

- (a) Most candidates were aware that the stopping distance of 53 metres could be found by adding the thinking distance and the braking distance. However, a significant number of responses were noted where the candidates had multiplied the figures together, producing a stopping distance of 570 metres. Candidates with this answer did not seem to appreciate that this was an unrealistic value.
- (b)(i) There were some excellent attempts at good quality curves. However, significant numbers of candidates were careless, did not start at (0,0) and many had lines below the original curve, or cutting through it.
- (b)(ii) The majority of candidates scored both marks with few candidates unable to score at least one mark.
- (c)(i) The vast majority of candidates were able to correctly match the conditions to the graph lines.
- (c)(ii) Many candidates achieved credit by identifying that the data for Driver **C** was derived from the adverse effects of two conditions and that further tests would be required to determine the relative effects of either condition to the driver's reaction time.

### Question 2 (*Low Demand*)

- (a)(i) This was well answered with the majority of candidates choosing the correct responses.
- (a)(ii) About 75% of candidates correctly said that the remaining charge would be positive. A few candidates gained credit for the answer proton.
- (a)(iii) This was question was generally answered correctly.
- (b)(i) This should have been an easy question and it was for many candidates, but a significant number did choose plastic or rubber thinking that it was necessary to have an insulator to stop electricity (rarely current or charge) flowing to protect the worker and/or the chip. Most of the candidates correctly choosing copper also gave a correct reason. A few candidates did manage to think or mistakenly write that copper was an insulator.
- (b)(ii) About 75% of candidates gave the correct answer.

**Question 3 (Low Demand)**

- (a) Candidates were generally aware of the correct wiring of a three-pin plug, the symbol for a fuse and a suitable material for the casing.
- (b) The easiest way to get 1 or 2 marks was to mention causing a fire and/or sparking. Many candidates wrote about 'too much electricity flowing' or similar rather than using the correct terminology with the words current or power. Many candidates showed confusion over the terms socket, plug and adapter, particularly in assuming that somehow the individual plugs would be overloaded. Many candidates mistakenly wrote about fuses 'blowing' and even 'blowing up'.

**Question 4 (Low Demand)**

- (a)(i) Most candidates were able to use the data and equation provided to produce a numerical value for the weight of the toy but there were few responses which stated the correct unit.
- (a)(ii) Most of the candidates were aware that the forces involved would need to be balanced to enable the toy to hover.
- (b)(i) Most candidates were able to explain the term 'acceleration' however, there were many references to 'move', 'increase' etc without any elaboration.
- (b)(ii) This was question was generally answered correctly however, there were a number of incorrect references to 'south'.
- (b)(iii) Half of the candidates understood that the momentum would increase but few could give a valid reason why.

**Question 5 (Standard Demand)**

- (a)(i) A large number of candidates were unable to differentiate between potential difference and current, and subsequently multiplied 9 by 8. Once again candidates obtaining an answer of 72 did not seem to realise that this answer was not only unrealistic but also impossible.
- (a)(ii) Very few candidates scored this mark, with many unanswered. Many of the candidates who correctly calculated the voltage across the resistor were not aware that they could find the potential difference across component X by simply subtracting 4 volts from the potential difference across the battery.
- (b)(i) Very few candidates identified component X as being a thermistor.
- (b)(ii) The majority of candidates were able to use the graph to find the temperature range where the change of resistance was the highest.

**Question 6 (Standard Demand)**

- (a)(i) Most candidates identified protons as being a contributor to the mass number of an atom but fewer candidates identified the neutron.
- (a)(ii) This was not answered well with many candidates dividing the mass number of 222 by 2 to give an incorrect answer of 111.
- (a)(iii) Although candidates were often aware that an atom of polonium-218 would have fewer protons and neutrons than radon-222, only some were specific in stating that there were two fewer of each.

- (b)(i)** Many candidates appreciated the need to add up the individual contribution of radiations. Unfortunately, too few candidates were able to successfully work out the correct proportion; too often, there were lists of every combination of the four rules applied to the two numbers concerned.
- (b)(ii)** Many of the incorrect responses were sources of natural background radiation, taken from the pie chart, rather than background radiation produced as a result of human activities, such as nuclear power generation or the medical use of X-rays.
- (c)(i)** Many candidates were able to extract the information needed from the bar chart to gain credit. However, a significant number of candidates gave imprecise answers, such as, 'almost twice' that gained no credit.
- (c)(ii)** There was no mark for circling 'yes' or 'no' but either could gain marks with a correct explanation. Candidates choosing the 'no' response seemed to gain marks more easily than those choosing the 'yes' response. In many cases 1 mark was gained either for the timeframe or for correctly relating to a dose. Relatively few candidates managed to get both of these together. Some candidates completely misunderstood the table even thinking that the dose figures referred to numbers of people. Some candidates did not realise that the dose figures obtained from the bar chart were very small compared to figures quoted in the table.

### **Mark ranges and award of grades**

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA website.