



**General Certificate of Secondary Education**

**Physics 4451**

**PHY3F      Unit Physics 3**

**Report on the Examination**

*2011 examination – January series*

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**Physics**  
**Foundation Tier PHY3F****General**

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

The majority of candidates attempted all parts of all questions, with few parts left unattempted.

This year there were fewer candidates whose standard of handwriting was so poor as to be almost illegible but still a number whose writing was so small or so faint that it was almost impossible to read.

Candidates should also make sure that they read all the questions properly since many candidates lost marks by not doing so, for example 4(a) and (c) and 8(c).

Candidates continue to find it difficult to draw conclusions from tables of data as in question 4(c), to take readings from diagrams, question 5, and to read graphical scales, question 8.

**Question 1 (Low Demand)**

- (a) Nearly two-thirds of candidates correctly named iron for the core of a transformer with a third opting for copper.
- (b) (i) Almost three-quarters of candidates recognised it as a step-down transformer.
- (b) (ii) Most candidates that answered part (b)(i) correctly were also able to answer this part question correctly.
- (c) Most candidates were able to answer both part (i) and (ii) correctly.

**Question 2 (Low Demand)**

- (a) (i) Most candidates identified the force as centripetal force.
- (a) (ii) Just under a half of the candidates knew in which direction the centripetal force acts.
- (b) (i) Candidates were uncertain as to the effect of mass on a force. Just under a half of candidates thought that a lower mass will cause an increase in force.
- (b) (ii) Two-thirds of candidates realised that an increased speed resulted in increased force.
- (c) Few candidates knew the effect of radius on centripetal force, with only a tenth of candidates naming the correct ramp and giving the correct reason for that choice.

**Question 3 (Low Demand)**

- (a) Over four-fifths of candidates identified the correct point.
- (b) Over three-quarters of candidates identified the turning effect as a moment.

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- (c) Half of the candidates understood the model arm and realised that the rubber band would exert a greater force than the weight. However a significant number of candidates thought that the forces were equal because the moments were equal.
  - (d) Nearly all candidates were able to put the correct numbers into the equation and produce the correct numerical answer.

**Question 4 (Low Demand)**

- (a) A number of candidates misread the instructions for this question and thought they could give one, two or no answers in each of the three boxes. They seem very unclear on the different types of satellite and their uses. Only a third of candidates achieved both marks.
- (b) Over four-fifths of candidates gave the correct answer.
- (c) (i) A number of candidates stated that the moon is not a satellite, some identifying it as a planet or star.  
  
However, a large majority of candidates gave an acceptable answer, most opting for the moon being much further away.
- (c) (ii) A number of candidates did not give any relationship at all. Some candidates just gave information relating to the moon or the ISS; others did not give a relationship between the stated variables.
- (c) (iii) Candidates lost marks in this question by using poor terminology; words like 'faster', 'quicker' and 'slower' were used for both speed and time. Answers were therefore often ambiguous and gained no credit.

**Question 5 (Low Demand)**

Just over half of the candidates, who read the diagram correctly had no difficulty with this question and scored full marks. However, a substantial number of candidates made errors in taking the measurements.

It was disappointing that, once again, some candidates added a unit to the magnification.

**Question 6 (Low Demand)**

- (a) (i) Candidates continue to have difficulty in identifying electromagnetic devices. However, half of the candidates correctly identified the motor, whilst a third of candidates thought it was a generator and a small minority of candidates a transformer.
- (a) (ii) Nearly three-quarters of candidates identified the force exerted as being the cause of the spin.
- (b) A number of candidates wrote down what needed to be changed but often not how they should be changed ie 'change the number of turns on the coil' rather than 'increase the number of turns on the coil' and so failed to gain credit. Candidates continue to use inappropriate adjectives eg 'bigger' magnets rather than 'stronger' magnets.

- (c) Only a fifth of candidates could give two correct changes. Again poor / inappropriate use of language stopped many candidates gaining any marks.

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

- (a) Just over half of the candidates could identify the type of lens shown in the diagram.
- (b) Just over three-fifths of candidates were able to correctly name the points labelled F.
- (c) (i) Explaining how a diagram shows whether an image is real or virtual continues to be a problem. Many candidates mention 'in front' or 'behind' the lens without identifying what they mean. Candidates need to state whether it is the same or opposite side of the lens to the object. A number of candidates negated any answer by mentioning reflections and / or mirrors.
- (c) (ii) Although just over three quarters of candidates scored this mark, it is surprising that most of the remainder thought that the image was upright.
- (d) (i) The response to drawing the line of best fit on given plotted points was extremely disappointing. Many candidates ignored the point at (40,2.9). The majority of candidates tried to draw a straight line through an obvious curve while others joined up the points with a ruler. Only a third of candidates drew an acceptable curve through the points.
- (d) (ii) Just over two-thirds of candidates gave the correct answer to this part question.
- (d) (iii) A large majority of candidates managed to give the basic relationship linking magnification and distance but a very small number of candidates gained the second mark by giving more detail.

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

- (a) Many candidates lost marks by not being careful enough in taking readings from the graph. A significant number of candidates gave 10 300 instead of 10 600.
- (b) Candidates had greater success in answering this part question. A common error however was to misread the scale and give an answer of 2500.
- (c) A considerable number of candidates misread the question as 'Can most people hear the full range of sound the loudspeaker produces?'. The answers given suggested some confusion between loudness and frequency and many answers were very vague such that no marks could be awarded.
- (d) The majority of candidates understood that this procedure improves the reliability.
- (e) Most candidates only answered in terms of making it a 'fair test' which was insufficient.

### **Mark Ranges and Award of Grades**

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