



General Certificate of Secondary Education

Physics 4451

PHY3F Unit Physics 3

Report on the Examination

2009 examination - January series

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Physics

Foundation Tier PHY3F

General

Questions 1, 2, 3, 4, 5 and 6 (Low Demand) were only on the Foundation Tier paper but questions 7 and 8 (Standard Demand) were identical to the first two questions on the Higher Tier paper.

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

There was a good response to the How Science Works features of the paper but a less confident response to items based on more traditional content such as 4a (a mirror) or 6b (the simple electric motor).

Question 1 (*Low Demand*)

Nearly all candidates knew that the network is called the National Grid, and most could identify the appropriate transformers and, most knew that, in a step-down transformer, the p.d. across the primary coil is more than the p.d. across the secondary coil.

Question 2 (*Low Demand*)

Most were able to identify the wave patterns with the smallest amplitude and with the lowest frequency.

Question 3 (*Low Demand*)

- (a) & (b) Less than half the candidates recognised that a racing car can accelerate by changing either its direction or its speed and identified friction as the force acting on a racing car and towards the centre of a circular part of the track. However, nearly all recognised that friction is acting as the centripetal force and most knew that it would be increased if the racing car had a greater mass and travelled faster.
- (c) Most candidates gained full marks on this item. Some candidates thought that members of the public would be able to use the racetrack and the mark scheme makes it clear that this idea is acceptable.

Question 4 (*Low Demand*)

- (a) Less than a third of candidates gained full marks. Many either gained no marks or made no attempt at the question.
- (b) Less than half the candidates could give a correct meaning to the term 'plane' in the context of a plane mirror. Some suggested it means a mirror without ornamentation.
- (c) Most candidates identified the conventional side-views as a convex and a concave mirror and had these descriptions the right way round.

Question 5 (Low Demand)

There was a very good response to this question on stars with a majority of candidates gaining the marks, or mark, in each of the four parts.

Question 6 (Low Demand)

- (a) A large majority of the candidates chose the correct four appliances from the list.
- (b)(i) The responses in part (b) were generally poor with only a minority able to gain a mark in (b)(i) with a similar, though improved, outcome in part (b)(ii).
- (b)(ii) Candidates should be advised that although ‘use more cells in the battery’ is correct in part (b)(ii) the ambiguous ‘use a bigger battery’ is not. For similar reasons the vague responses of ‘use bigger magnets’ and ‘use a bigger coil’ were not awarded marks.

Question 7 (Standard Demand)

- (a) & (b) The majority of candidates chose the correct response and nearly all knew that the symbol kHz stands for kilohertz.
- (c)(i) & (ii) A significant minority of candidates could give an industrial use for ultrasound and a majority could give a medical use. It should be noted that vague responses such as ‘scanning organs’ did not gain a mark. Candidates needed to be more precise eg ‘scanning the kidneys’ or ‘scanning an unborn baby’.
- (d) Many candidates were able to interpret the diagram, and the information given about the scale, and correctly deduce that the time interval is 8 microseconds.
- (e) Few candidates were able to deduce that if the time interval is known then the distance travelled can be calculated.
- (f) Most candidates obtained a mark for the suggestion that, in this imaginary event, we should stop using ultrasonic waves but few had any sensible qualification to make and seemed unaware to the harm this reaction could cause.

Question 8 (Standard Demand)

- (a) & (b) Many candidates realised that the data shows that as the load increases the maximum safe distance decreases but only a minority of these could explain why the crane driver’s conclusion is correct.
- (c) Several hazards were mentioned with a minority of candidates stating that the mobile crane may topple over, or words to that effect.
- (d) Most candidates were able to select ‘results of experiments on this crane’ as the appropriate source for the data 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.