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General Certificate of Education

Physics 4451

PHY3F Unit Physics 3

Report on the Examination

2009 examination - June series

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Physics

Foundation Tier PHY3F

General

All the question parts were attempted by nearly all the candidates, there were however some examples of almost unreadable handwriting and frequent examples of poor spelling.

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

There was a fairly good response to the 'How Science Works' features of the paper but there was a less confident response to items based on more traditional content such as 5(b) on reflection or 7(a)(i) and (ii) on a simple transformer.

Question 1 (Low Demand)

- (a) Nearly all candidates were able to mark the centre of mass of the square sign.
- (b) Nearly all candidates were able to draw one axis of symmetry.
- (c) Only a small minority of candidates associated a moment with a turning effect.

Question 2 (Low Demand)

- (a) (i)&(ii) Just over half the candidates correctly linked acceleration with change in direction and two thirds were able to identify the resultant force as centripetal.
- (b) A minority of candidates gave the correct direction for this force.
- (c) About half of the candidates knew that it will need to be greater if the mass of the passengers is greater.

Question 3 (Low Demand)

- (a) (i)&(ii) Most candidates correctly identified the equipment as a microphone and an &(iii) oscilloscope but most **incorrectly** stated that the distance x represents half the amplitude of the sound wave, and that when x becomes smaller the pitch/ frequency/ wavelength of the sound becomes less.
- (b) Most candidates gained some credit for knowing that sound cannot travel through a vacuum but many, by failing to make it clear that space contains nothing to vibrate, did not gain a second mark.

Question 4 (Low Demand)

- (a) (i)&(ii) A small minority of candidates gained all three marks for the table but a large majority knew that a geostationary satellite orbits the Earth in twenty four hours.
- (b) Most candidates knew that the force of gravity on a rocket travelling from Earth decreases as the distance increases.
- (c) (i)&(ii) Most candidates indicated a use for satellites. However, only a small minority were able to express clearly a possible objection to spending money on the building and launching of satellites.

Question 5 (Low Demand)

- (a)(i)&(ii) Most candidates knew that the surface of a pond acts like a plane mirror but only a small minority chose both of the words 'inverted' and 'virtual' to describe the image in the pond. Many candidates chose one of these words correctly.

- (b) This was rarely answered correctly for three marks. Common errors were;
- to show reflection taking place other than at the surface of the water
 - to show the direction of light from the frog to the insect.

Question 6 (Standard Demand)

- (a) A large majority of candidates identified the force as gravitational.
- (b) (i) A small minority of candidates were able to offer a correct response with 'bigger stars' as a popular incorrect answer.
- (b) (ii) A majority of candidates were able to offer a correct response.
- (b) (iii) A majority of candidates scored the mark but it is of concern that some candidates suggested universe, Earth or moon as possible names for our galaxy.

Question 7 (Standard Demand)

- (a) (i) A majority of candidates identified the secondary coil.
- (a) (ii) Only a small minority of candidates could identify the transformer's core and state that it is made of iron.
- (a) (iii) A small minority of candidates gained any credit for magnetic field, and only the better candidates knew it is alternating. Most candidates claimed that the current passes through the core to the secondary coil.
- (b) The majority of candidates correctly identified the 'step-up' and 'step-down' transformers.
- (c) The majority of candidates gained both marks by realising that to reduce the risk, new houses should not be built near to existing power lines and that new power lines should not be built near to where people live.

Question 8 (Standard Demand)

- (a) Just fewer than half the candidates were able to link the description of the process in the correct order; **E, C, B, D** and **A**.
- (b) Poor written expression often led to a loss of marks as 'bigger magnet' and 'bigger coil' are not acceptable responses. The mark scheme required 'increase the number of turns on the coil' and 'replace the magnet with a stronger magnet'. Some candidates failed to read the question correctly and wrote about shaking the torch harder or for longer.
- (c) (i) Nearly all candidates were able to recognise that the torch remains lit for longer if it has been shaken for longer.
- (c) (ii) The great majority of candidates gained at least one mark by stating that the measurements had not been repeated or by realising that the student might change the rate or vigour of shaking. A small minority mentioned that the student might have difficulty in measuring exactly when the light goes out.

Mark Ranges and Award of Grades

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