AQA

General Certificate of Secondary Education

Physics 4451

PHY3H   Unit Physics 3

Report on the Examination

2011 examination – January series

Physics
Higher Tier PHY3H

General

Questions 1 to 3 were standard demand, targeting grades C and D. Questions 4 to 8 were high demand, targeting grades A* to B.

Candidates were able to access all questions with very few part questions not attempted by the vast majority of candidates; the exception being parts of question 7.

There was no evidence of candidates being unable to complete the paper due to lack of time.

Question 1 *(Standard Demand)*

(a)   Just over four-fifths of candidates were able to identify the type of lens correctly.

(b)   Almost all candidates were able to correctly name the points labelled F.

(c)   (i)   Candidates had difficulty in explaining how to tell that an image is real. Many candidates said the image was behind or in front of the lens however this is ambiguous and gained no mark. Candidates need to be more precise when describing a position in relation to the lens. 'The other side of the lens to the object' would have gained a mark.

(c)   (ii)   Nearly all candidates identified the image as being inverted. However, it seems surprising that just under a tenth of candidates thought that the image was either larger or upright.

(d)   (i)   Answers to this part question were generally poor: about half of the candidates attempted curves as the line of best fit, but of these, a significant proportion did not include the first point. Most of the other candidates constructed straight lines, some of which made no contact with the points at all.

(d)   (ii)   Just over four-fifths of candidates identified the correct reason for drawing a line graph.

(d)   (iii)   Most candidates were able to give a basic relationship linking magnification and distance but few gave any detail in order to gain the second mark.

Question 2 *(Standard Demand)*

(a)   Many candidates demonstrated an inability to read a value from a graph scale. A frequent incorrect answer was 10 300.

(b)   This part question proved easier than part (a) to most candidates. However, there were still a significant number of incorrect answers given as 2500.

(c)   A large number of candidates seemed to misread the question as 'Can most people hear the full range of sound the loudspeaker produces'. However even doing this, it was still possible to gain both marks. Unfortunately, once again, many candidates did not gain credit as they misquoted figures taken from the graph. Many candidates correctly gave the upper limit of the human hearing range but were less sure of the lower limit.

(d)   The majority of candidates understood that this procedure improves the reliability.

(e)   Most candidates are still answering in terms of 'fair test' with no further explanation of what this actually means. This is insufficient for a mark to be awarded.

Question 3 *(Standard Demand)*

(a)   (i)   Most candidates located the 'X' in the correct region.

(a)   (ii)   Many responses just said that this was the CoM location with no reason given.

(b)   Over half of the candidates described two clear changes and gained both marks. The most common answers being 'lower the centre of mass' and 'make the base area larger'. However, once again, poor use of language or vague answers, such as, 'make the toy smaller' stopped many candidates from gaining marks.

Question 4 *(High Demand)*

(a)   This calculation was completed correctly by three quarters of candidates. Those who did not have the correct calculation frequently did not show a full substitution into the equation and so lost the compensatory mark.

(b)   Considering how many times this question has been asked, the answers given were poor. Most responses were in terms of electrocution and energy loss.

(c)   (i)   Most candidates scored this mark although 'copper' was a fairly common incorrect response.

(c)   (ii)   Fewer candidates knew why iron is used, with many responses given in terms of electrical conduction.

Question 5 *(High Demand)*

(a)   The calculation was generally well done with nearly two-thirds of candidates gaining full marks, including that given for the unit.

(b)   Many candidates appreciated the possibility of the fork lift truck 'toppling', however fewer were able to give a correctly worded explanation as to why this should happen.
Of those who attempted this, some candidates only referred to a single moment which was not identified as the resultant; others referred to more than one moment but did not identify the direction of action.

A significant number of candidates did not appreciate that part (b) was linked to part (a) and did not read the instruction to explain in terms of moments. This resulted in many responses linked to other vehicles, most often a taxi. Answers in terms of momentum and the problems in cornering and the weight of the passengers were then common.

Question 6 *(High Demand)*

Answers to this question were disappointing with only just under a third of candidates scoring all three marks. Many candidates were careless in drawing construction lines and some lost the 'image' mark by not linking its position to the principal axis. A number of candidates treated the question as a lens with constructions behind the mirror.

Question 7 *(High Demand)*

In general, this question was poorly answered with the largest proportion of unattempted part questions on the paper.

(a) (i) Few candidates were able to name the effect correctly. The most common incorrect answer was 'the motor effect'.

(a) (ii) Almost two-thirds of candidates scored zero. Many responses were in terms of the 'motor effect'. Those candidates that realised it was to do with induction produced a standard response without regard to the information given in this question.

(a) (iii) Very few candidates scored this mark even though the answer was given at the start of the question.

(b) Just over three-fifths of candidates scored at least one mark. The most common error was simply to repeat that Jupiter has the strongest magnetic field without then referring to the possibility of other satellites being in a weaker magnetic field.

Question 8 *(High Demand)*

(a) Just under three-quarters of candidates scored this mark, with most answers given in terms of gravitation.

(b) There were two alternative ways to answer this part question. Even so, only a fifth of candidates managed to score both marks. Some candidates did not refer to 'radiation pressure' correctly although the idea was inherent in their response. Some candidates did not include the direction of the forces involved. There were a significant number of candidates who lost marks by references to 'burning' hydrogen / fuel.

(c) (i) Just over half of the candidates scored one mark. However, some lost marks by references to 'burning' and others to 'fission'.

(c) (ii) Few candidates scored this mark. There were few references to the amount of hydrogen in a star.

(d) Again this question was poorly answered with only two-fifths of candidates scoring the mark. It was evident that some candidates do not take notice of the space and mark allocation given to questions and gave extensive, usually incorrect, responses to this question.

Mark Ranges and Award of Grades
Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.