GCSE

PHYSICS

PH3HP

Report on the Examination

4403

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General

Questions 1 to 3 were common with the foundation paper and were of standard demand, targeting grades C and D. Questions 4 to 8 contained a mixture of standard and higher demand parts.
The paper was accessible to the vast majority of students, with very few un-attempted items seen. All students appear to have completed the paper within the available time.
The standard of mathematics was reasonable overall. Working was generally clear, and students performed well with calculations involving substitution and re-arrangement. Students coped well with the calculation involving standard form (question 8(b)), but performance in the questions involving sine (question 5(d)(i)) and inverse sine (question 7(b)) were not of the same standard. There was evidence that some students failed to bring a scientific calculator to the examination.
Written responses showed a varied standard. Short answer responses were well tackled, and performance in the 6 mark QWC question was generally better this year. Written extended responses to unfamiliar situations were lacking in clarity and detail overall.
There was evidence that some students should have been entered for the foundation tier rather than the higher tier.

Question 1 (Standard Demand)

(a) Just over half of the students accurately described what ultrasound is. Answers not gaining credit were often vague responses to 'very high frequency' or 'sound which cannot be heard.'

(b) Just over a third of the students gained all 3 marks for this calculation. Over half of the students failed to take the echo into account and so scored 2 marks. About one student in twenty failed to gain any marks.

(c) Over two thirds of the students stated a correct medical use of ultrasound scanning. Many students who did not gain the mark were often not specific enough in their answer; 'baby scanning' was a common response that was not sufficient.

(d) Almost half of the students could state either an advantage or disadvantage of CT scanning, with over a third of students correctly stating both. Only about one student in ten did not score any marks for this question.

Question 2 (Standard Demand)

(a) Most students correctly identified that gravity provided the centripetal force on the satellite.

(b) Half of the students correctly stated two factors that affected the size of the centripetal force on the satellite, with a further third identifying one factor correctly. Answers that failed to score lacked sufficient detail e.g. 'mass' or 'radius', which could equally apply to the Earth as well as the satellite, so were not sufficient to gain marks.

(c)(i) Very few students failed to state the correct relationship.

(c)(ii) Four fifths of the students correctly identified that there was no relationship between the mass of a satellite and its orbital period. Some students tried to identify a pattern which excluded one or more results as anomalous.

(d) A small proportion of students failed to identify that Isaac Newton was a respected scientist who had made new discoveries before.

Question 3 (Standard Demand)

(a) Many students produced clear and coherent answers about the two types of transformer. Over a third of students produced a level three response worth 5 or 6 marks. A further quarter produced a level two response worth 3 or 4 marks. Most answers referred to an iron core and the better ones also described copper coils and plastic insulation. Some students were confused between step-up and step-down transformers and stated the turn ratio the wrong way round.

(b) Less than a third of students could correctly recall a switch mode transformer.

Question 4 (Standard and High Demand)

(a) Almost two thirds of the students correctly calculated the total moment. Some added the weights and distances prior to multiplying them. Only half of the students who correctly calculated the moment could correctly state the unit. A number of students lost the unit mark by mixing upper and lower case letters.

(b) Many students failed to follow the instruction in the question that clockwise and anticlockwise moments are needed in the explanation, with a third of students scoring zero. A further third scored one mark. Many students referred to forces rather than moments, or simply used the word ‘balanced’ without relating it to the moments.

Question 5 (Standard and High Demand)

(a) About one in ten students correctly identified both a CCD and the pupil, with two thirds of the students correctly identifying one part. A number of students were mistaken in thinking that film is used in a digital camera.

(b) A poorly answered question, with over half of the students failing to score any marks. A third of the students scored one mark, usually for stating that the eyeball is too short. Some students described aspects of life e.g. ‘excessive use of a computer’ rather than defects in the eye that would lead to long sight.

(c) Four fifths of the students correctly calculated the focal length of the lens.

(d)(i) Over half of the students correctly used (sin i)/(sin r) and gained all three marks in this calculation. Some attempted to use 1/(sin c) which was incorrect.

(d)(ii) Half of the students gained 1 mark for their answer. Many students referred to changes to focal length or power rather than the lenses being made thinner or the glasses being lighter.

Question 6 (Standard and High Demand)

(a) One fifth of the students gained all 5 marks, almost a quarter of the students gained 4 marks, and a further fifth gained three marks, with a well expressed answer that gave each step. Many students failed to give a logical order. Often the first mark wasn't gained as there was no mention of a method of suspension.

(b)(i) A poorly answered question, with about four fifths of students failing to score a mark. Many answers were in terms of forces rather than moments. The term 'line of action of the weight' was rarely seen in responses.

(b)(ii) Almost three fifths of the students gained both marks for two correct suggestions that would make the wheelchair and user more stable.

Question 7 (Standard and High Demand)

(a) One third of students gained 1 mark. 'Repeatedly reflected inside' was a common response, rather than the correct term 'total internal reflection.'

(b) Half of the students correctly calculated the critical angle, with a further third gaining a compensation mark for a correct substitution. Some students could not use the inverse sine mode on their calculators to obtain the correct angle.

(c) Many students failed to process the information supplied in the graph, and often just stated values. Less than one student in twenty gained all 3 marks.

Question 8 (Standard and High Demand)

(a) Over four fifths of students recalled it was a hydraulic system, but there was a range of misspellings used.

(b) About four fifths of the students gained full marks for the calculation using standard form.

(c) Half of the students gained 1 mark in this societal aspects of science question. Many did not score as their answer was too vague or because they gave a disadvantage of the usual oil. A small number wrote correctly about the conservation of fossil fuels but most who answered in terms of fossil fuels wrote about the negative side of using them.

(d) Students struggled to apply their knowledge to the given situation of a loudspeaker. Written responses often failed to show a logical progression. A small proportion of students scored 3 or 4 marks. There was widespread confusion with the transformer. Few students referred to a force or to the direction of the force changing as the direction of the current changes. Very few mentioned 'force' but some stated 'attraction / repulsion'. Descriptions often did not include the direction of the force changing when then current changed direction.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator