GCSE
PHYSICS

8463/1F: Paper 1 (Foundation tier)
Report on the Examination

8463
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General

Calculation questions set at grades 1-3 were well answered, here the equation is always given and students will not be required to rearrange the equation. Grade 4-5 calculation questions were answered more successfully this year as all students had an Equations Sheet with all the equations printed on it. At grades 4-5 students are expected to be able to either rearrange an equation or convert a unit, so it is beneficial for students to be able to quickly identify if the units given in a question are correct for the use in the equation. Question 10.1 discriminated well between students and was generally well attempted. However, the Additional Information published prior to the exams stated that the density required practical would feature in the exam, so students who had carried out the activity and learned a valid method would have had a material advantage over those who hadn't.

Handwriting continues to be a problem for a large number of students, making it very difficult for examiners to read what has been written. Students who have handwriting that is difficult to read may benefit from a scribe or from word processing their answers in exams.

Levels of demand

Questions are set at two levels of demand on this paper:

- **Low demand** questions are targeted at students working at grades 1–3.
- **Standard demand** questions are targeted at students working at grades 4–5.

A student's final grade, however, is based on their attainment across the qualification as a whole, not just on questions that may have been targeted at the level at which they are working

Question 1 (Low demand)

01.1 About 40% of students answered this question correctly.

01.2 Approximately 80% of students answered this question correctly. The most common mistake was to not square the extension. This would then just score a mark for the substitution, if correct.

01.3 Students were required to multiply their answer to question **01.2** by 40. However, many students did not answer this correctly. Many students tried to calculate the elastic potential energy using the equation, scoring zero marks. About 60% of students answered this question correctly.

01.4 About 65% of students scored 2 marks on this question. However, a number of students didn't score any marks as they did not appear to be able to calculate a percentage, which is one of the mathematical skills stated in the specification.

01.5 Approximately 60% of students answered this question correctly.

Question 2 (Low demand)

02.1 About 80% of students answered this question correctly. 'Metre stick' was ignored, so if students gave a list eg 'metre stick or tape measure' they could still score the mark.

02.2 About 90% of students completed this calculation correctly, scoring 2 marks.

02.3 About 90% of students completed this calculation correctly, scoring 2 marks.

02.4 90% of students identified the correct stop-clock.

02.5 90% of students completed this calculation correctly, scoring 2 marks. The most common mistake was to not square the speed. This would then just score a mark for the substitution, if correct.

Question 3 (Low demand)

03.1 Approximately 30% of students scored 2 marks, with about 60% of students scoring 1 mark.

03.2 55% of students identified the charge correctly.

03.3 About 75% of students chose the correct box (repulsion), but many students couldn't give an appropriate reason. Students often just said 'opposite charges attract' which was insufficient, or discussed magnetic poles which was not creditworthy. Approximately 30% of students scored 2 marks on this question.

03.4 About 35% of students chose the correct electric field pattern.

03.5 Approximately 65% of students chose the correct position of the charged spheres.

Question 4 (Low demand)

04.1 About 50% of students correctly identified what an alpha particle consists of.

04.2 Approximately 40% of students correctly identified what a beta particle is.

04.3 About 45% of students chose the correct equation for the decay.

04.4 This question discriminated well with a good spread of marks. A quarter of students scored 3 marks, 40% of students scored 2 marks or more and 70% of students gained 1 mark or more.

04.5 This question discriminated well with a good spread of marks. About 30% of students scored 3 marks, approcimately 40% of students scored 2 marks or more and about 80% of students scored 1 mark or more.

04.6 About 75% of students correctly identified the man-made source of background radiation.

Please note there is no reference to 04.7

Question 5 (Low and standard demand)

05.1 65% of students chose the correct measuring instrument.

05.2 60% of students chose the correct type of variable.

05.3 75% of students answered this question correctly. Not conventional lab equipment in many cases, but creditworthy. Gloves of varying description being a common response.

05.4 A question that discriminated well between students. 50% of students scored 4 marks for this calculation. Most incorrect answers multiplied the energy and the change in mass, which scored no marks for their numerical answer. The unit mark was independent so could be scored separately from the numerical answer.

05.5 55% of students chose the correct source of error.

Question 6 (Low and standard demand)

06.1 35% of students recognised the resistors were connected in parallel with the power supply.

06.2 70% of students answered this question correctly.

06.3 70% of students answered this question correctly.

06.4 95% of students answered correctly, All students had the equations on the Physics Equations Sheet for the 2022 series.

06.5 70% of students answered correctly, scoring 3 marks. Students who did not gain any marks commonly multiplied the power and the energy values together. The first marking point was for the substitution, which students who couldn't rearrange often failed to score as they only wrote down 3600 × 1200 and their incorrect answer.

06.6 About 55% of students identified the correct circuit symbol.

Question 7 (Low and standard demand)

07.1 Approximately 50% of students scored both marks. Many students stated nuclear was renewable. Many students stated biofuel was non-renewable.
Students who guessed often scored zero as 2 correct ticks were not enough to score a mark.

07.2 Less than 3% of students scored full marks. Students who scored 1 mark usually scored the 3rd marking point for 'energy'. The 4th marking point scored more often than the 1st or 2nd marking points.

07.3 95% of students answered correctly as they had all the Physics equations on the Equations Sheet for the 2022 series.

07.4 Few students attempted to convert the time into seconds, so arrived at an answer of 650 000, scoring 2 marks. Few students chose the correct unit, watts being a common incorrect response. 15% of students scored all 4 marks.

Question 8 (Low and standard demand)

08.1 25% of students identified the correct resolution.

08.2 90% of students answered this question correctly.

08.3 Students struggled to interpret the scale on the graph so often didn't score the first marking point, but could score the remaining 3 provided their calculation was correct. Students who used the final temperature (62.5 °C) in place of the temperature change (12.5 °C) could have scored 2 marks for correct use of the equation, which would lead to an answer of 31 500 J. A fair number of students multiplied 0.12 and 4200, scoring no marks. If a student included a negative sign in front of their value for energy, it was ignored. 40% of students scored all 4 marks.

8.4 90% of students identified the anomalous result.

8.5 Some students seemed to think that the conclusion they were asked for related to the anomaly, rather than all the data on the graph, so suggested improvements rather than conclusions. Many students stated the converse conclusion for the second conclusion scoring only 1 mark. 20% of students scored 2 marks, while about 45% of students scored 1 mark.

Please note there is no reference to 08.6 or 08.7

Question 9 (Standard demand)

09.1 Approximately 10% of students scored 2 marks. The unit conversion caused a problem for many students and powers of 10 errors were frequently seen. A correct calculation using an incorrectly or not converted value for power would score 1 mark.

09.2 Students were quite successful answering this questions with 25% scoring 2 marks and about 55% scoring 1 mark. Most students wrote variations of the first and third bullet points in the markscheme. A number of students wrote that the turbines may be broken, which was enough to score a mark for the idea of maintenance.

09.3 'Turbine will rotate faster' was insufficient to score a mark. 'Rotate more smoothly' was not enough to score the 'less friction' mark. Students who stated that 'no energy was wasted' did not score the second marking point. 2% of students scored 3 marks, 10% of students scored 2 marks and about 30% of students scored 1 mark.

09.4 5% of students scored 2 marks, while about 35% of students scored 1 mark. Many students answered in terms of 'saving energy' which was insufficient. Other students answered in terms of absolute statements which did not score, 'energy efficient appliances waste no energy' for example.

Question 10 (Standard demand)

10.1 Few students scored 5 or 6 marks. 10% of students scored 5 or 6 marks. A number of students made incorrect statements like 'measure the weight on a balance', which prevented them moving into Level 3. Many students did not give the equation correctly, despite the equation being on the equation sheet for the 2022 series. Many students incorrectly referred to using a 'scale' to measure the mass, as opposed to 'scales'. 'Weighing the stone to find its mass' was condoned. Many answers lacked technical accuracy - 'using a density tube' was seen on numerous occasions. 10% of students did not attempt the question, despite the practical being given in the Advanceinformation.

10.2 Approximately 40% of students answered correctly. A common incorrect answer was maximum: 2.55 (g/cm^3) and minimum 0.10 (g/cm^3).

10.3 About 75% of students answered this question correctly.

10.4 About 10% of students scored 2 marks on this question and approximately 35% scored 1 mark. Many students stated that 'the student could have measured it wrong the first time' which was insufficient. 'Eliminates anomalies' was not creditworthy.

Question 11 (Standard demand)

11.1 About 90% of students answered this question correctly as they had all the Physics equations on the Equations Sheet for the 2022 series.

11.2 Many students could not rearrange the given equation. 48% of students scored 0 marks. 51% of students scored 3 marks.

11.3 About 90% of students answered this question correctly as they had all the Physics equations on the Equations Sheet for the 2022 series.

11.4 Despite being another equation that needed rearranging, students were more successful at answering this question, compared with question **11.2**. About 75% of students scored 3 marks, whereas approximately 20% of students scored 0 marks. ‘Saves money’ did not score unless it was linked to a bill or the amount of electricity used, as the cost of a new energy efficient appliance may be considerably more expensive than the cost to run an inefficient appliance.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account of how students have performed for each question.

Mark Ranges and Award of Grades

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