GCSE
PHYSICS

8463/1H

Report on the Examination

November 2021

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General Introduction to the Autumn Series

This has been another unusual exam series in many ways. Entry patterns have been very different from those normally seen in the summer, and students had a very different experience in preparation for these exams. It is therefore more difficult to make meaningful comparisons between the range of student responses seen in this series and those seen in a normal summer series. The smaller entry also means that there is less evidence available for examiners to comment on.

In this report, senior examiners will summarise the performance of students in this series in a way that is as helpful as possible to teachers preparing future cohorts while taking into account the unusual circumstances and limited evidence available.

Overview of Entry

The entry for this series was significantly smaller than a normal series.
Most entries were single students entering from single schools, rather than many students being entered by schools with large entry numbers. Of these entries, private students made up a much larger proportion compared with normal entries.

Comments on Individual Questions

Question 1 (Common Question)

Very few students answered **01.1** correctly, but students were much more successful with equation recall and the subsequent calculations that followed, with around 80% answering **01.2** and **01.3** correctly and over 90% answering **01.4** and **01.5** correctly.

Question 2 (Common Question)

Question **02.1** was not very well answered, around half the students scored the first marking point, but very few scored the second. The calculation was well answered, the most common mistake was not converting the mass from g to kg. Questions **02.3** and **02.4** were generally well answered due to the numerous options allowed in the mark scheme.

Question 3 (Common Question)

Students found this Required Practical question difficult and students did not score many marks across the whole question. Many confused responses were seen for **03.1** mixing up other required practical activities. Only a third of students scored a mark on **03.2** and **03.3**, many students incorrectly thought they needed to read the value on the ammeter in **03.3**. Question **03.4** was better answered with 45% of students giving a correct answer, the most common answer being ‘more accurate’. Many students are still using the term ‘precision’ when they mean ‘resolution’.

Question 4
Question **04.1** was poorly answered with many incorrect answers seen. A common incorrect answer was 'scale', as opposed to 'scales'. Since all measuring instruments have a scale, this answer did not score. Students should be encouraged to not give multiple answers, as was common here, as examiners apply the 'list principle' when this happens. Questions **04.2** and **04.3** were well answered, but students found **04.4** difficult with most students not understanding that 'precision' refers to the spread of repeat readings, rather than the resolution of an instrument or its accuracy.

Question 5
Calculations in question **05** were well answered, but students often failed to convert units, converted units incorrectly or made 'power of ten' errors, so did not gain full marks. Students found **05.4** difficult with almost no students scoring 2 marks and only 25% of students scoring 1 mark.

Question 6
Questions **06.1** and **06.2** were well answered, but few students scored any marks on the remainder of the question. In question **06.5** students often failed to give sufficient technical accuracy when describing radioactive decays.

Question 7
Question **07.1** discriminated well between students and there were multiple ways of arriving at the answer, using a selection of electricity equations. To score 2 marks in **07.2** students needed to select 3 sets of values to show that the constant was the same and very few students managed to do this. Many students simply stated that as one quantity increased, the other quantity decreased, revealing that they did not understand the term inversely proportional.

Question 8
This question was well attempted, with the multistep calculation in **08.2** discriminating well between students. Many students calculated the change in gravitational potential energy but couldn't take the next step in the calculation, so scored 2 marks only.

Question 9
Questions **09.1** and **09.3** were well answered with 45% of students scoring 4 marks on **09.3**. Less than 10% of students scored a mark on **09.2,** with many students stating that either the volume or the equipment was kept the same, neither of which were creditworthy. Question **09.4** was poorly answered with few students demonstrating sufficient technical accuracy in their explanation. Common errors were to refer simply to 'more collisions' rather than the 'frequency of collisions' and not referring to the force exerted on the container walls.

Question 10
Question 10 was poorly answered across the question. Few students were able to explain the benefit of transmitting electricity at a high potential difference in **10.1**. Many students stated, incorrectly, that static electricity was responsible for the danger involved in flying a kite near power cables. Question **10.3** was poorly answered and many students chose to continue the existing graph line, rather than draw their own. Very few students appreciated in **10.4** that the wires would behave as if they are in parallel, despite the question stating this.

Question 11

Question **11.1** was answered poorly, with many students mixing up specific heat capacity and specific latent heat in their answers, and referring to incorrect parts of the graph. Around a third of students scored a mark on **11.2** and **11.3**. Question **11.4** discriminated well with a good spread of marks. The unit conversion was often performed incorrectly, which led to a 'power of ten' error and prevented students gaining a mark. Few students gave the correct unit, even though the equation needed is on the equations sheet.

Concluding Remarks

This paper was broadly similar to papers from previous series. The errors that students made in calculations were common errors, usually involving incorrect unit conversions or failing to convert units.

An area of the specification that stood out as being particularly poorly answered was section 4.2 which was tested in the Required Practical Activity in question 3 and again in question 10.

Most of the students understand the importance of showing clear working out when completing a calculation. This is crucial in the more complex calculations.

Similar to previous series, a significant number of the students were unable to read values from graphs accurately and failed to realise when numerical values were not given in standard SI units.

Mark Ranges and Award of Grades

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