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# GCSE PHYSICS

8463/1F Paper 1  
Report on the Examination

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8463/1F  
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## General

Grade 1-3 calculation questions were well answered, where 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 grade 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 10.5 discriminated well between students of different abilities and was generally well attempted.

Handwriting continues to be a problem for a large number of students, making it very difficult for examiners to read what has been written.

## 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** Students were very successful with 91 % of students scoring a mark. Common incorrect answers were 'open circuit'. The state of the switch (open / closed) was ignored in this question.
- 01.2** 34% of students scored 1 mark, while 39 % scored 2 marks.  
Current was a more common correct answer than potential difference.
- 01.3** Only 5% of students scored 3 marks for identifying the effect of increasing the resistance, , with 47% of students scoring 2 marks and 34 % of students scoring 1 mark.
- 01.4** 90% of students answered this calculation correctly, scoring 2 marks.
- 01.5** 87% of students answered this calculation correctly, scoring 2 marks.
- 01.6** 16% of students scored 2 marks, while 51 % of students scored 1 mark.  
Most students answers appeared to be based on guesswork rather than recognising the general trend for each graph.
- 01.7** 42% of students correctly identified the type of error.

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**Question 2 (Low Demand)**

- 02.1** 47% of students correctly identified the particle.
- 02.2** 86% of students scored 2 marks on this calculation question.
- 02.3** 57% of students correctly identified the charges.
- 02.4** 75% of students correctly identified the description of the force.
- 02.5** 78% of students identified the correct alpha particle.
- 02.6** 39 % of students answered correctly. 'Tiny spheres' was enough to score the mark for students who could not manage to write all 6 words.
- 02.7** 23 % of students identified the correct model.

**Question 3 (Low and Standard Demand)**

- 03.1** 29% of students scored 2 marks, while 27 % of students scored 1 mark for this question about isotopes..
- 03.2** 51% of students knew what half-life means.
- 03.3** 77 % of students correctly identified the least stable isotope.
- 03.4** Students found this question difficult with only 38% scoring 2 marks and 21% scoring 1 mark for this question about irradiation and contamination.
- 03.5** 68% of students identified the purpose of the sticky floor.
- 03.6** 72% of students scored 2 marks on this calculation question.
- 03.7** This question discriminated well with 46 % of students scoring 2 marks and 20 % of students scoring 1 mark for this question about fission and fusion

**Question 4 (Low and Standard Demand)**

- 04.1** 93% of students scored 2 marks on this calculation question.
- 04.2** 84% of students scored 2 marks for this calculation question.
- 04.3** In this exam series students were provided with an equations sheet with all equations given. 95 % of students answered the question correctly.
- 04.4** A question that discriminated well. 16% of students scored 3 marks, while 63 % of students scored 2 marks for an answer of 180 000, having not converted the time to seconds.

- 04.5** Some students appeared to confuse the power output of the hydroelectric generator with the power demand of the consumers. 'People use less power in the summer' being seen as a common incorrect answer. Students needed to link rainfall / water level to the summer months to score both marks. Referring to 'hotter months' was insufficient for 'summer months' or named months. Examples of specific changes were creditworthy eg 'less/more water in the river' or 'rainfall may be less/more' for the 1<sup>st</sup> marking point. Both marking points could be the converse of what appeared in the mark scheme. 30% of students scored 2 marks, while 22% of students scored 1 mark.

### **Question 5 (Low Demand)**

- 05.1** 75% of students correctly identified the reason for using the funnel.
- 05.2** 40% of students correctly identified the reason for not using insulation..
- 05.3** Well answered with 88 % of students scoring the mark. Answers of 'timer' were ignored, which means if a student wrote ' timer or stop-clock' they would score the mark.
- 05.4** Many students identified one or two ways to improve the experiment but very few could give a valid reason for why it would be an improvement. 32 % of students scored 2 marks, while 34% of students scored 1 mark. 'Same amount of insulation' was creditworthy, as was 'same amount of water'. Any suggested change followed by the reason 'it is more accurate' was insufficient to score the explanation mark.
- 05.5** 71% of students scored 1 mark by choosing ' bar chart / graph', while only 4% of students scored 2 marks. Common answers which were insufficient were 'easier to read' and 'see the results more clearly'. 'Data is categoric' or 'data is not continuous' were creditworthy reasons which scored the second marking point.

### **Question 6 (Low Demand)**

- 06.1** This question discriminated well with 24% of students scoring 3 marks, 39 % scoring 2 marks and 30% scoring 1 mark, for comparing the energy stores.
- 06.2** 82% of students scored 2 marks for this calculation. The most common mistake was to forget to square the extension.
- 06.3** 34% of students gave the correct reason.
- 06.4** While 39% of students chose cord A, only 34% of students gave a correct reason. 'Greater extension' was insufficient unless also linked to 'snapping'.

### **Question 7 (Low and Standard Demand)**

- 07.1** 89% of students correctly identified the direction of the particles.
- 07.2** 56% of students correctly identified the movement of the particles.

- 07.3** 30 % of student scored 3 marks, while 58 % of students scored 2 marks for completing this graph. Lines of best fit extended beyond the plotted points were ignored. The line of best fit needed to pass through, or close to, every point to score. Dot to dot lines were not acceptable.
- 07.4** 86% of students scored 2 marks for this calculation.
- 07.5** Only 7% of students scored 3 marks, while 35% scored 2 marks and 36% scored 1 mark for identifying the effect of increasing the volume of the gas.

### Question 8 (Standard Demand)

- 08.1** 32% of students scored 2 marks, while 17% scored 1 mark. Some students hedged their bets by writing either 'increase' or 'decrease' for both gaps.
- 08.2** 9% of students scored this mark. The equations sheet was provided for this exam series.
- 08.3** 42% of students scored 3 marks. The most common mistake was to forget to square the current when substituting. For 3 mark calculations, these general principles apply:  
The 1<sup>st</sup> mark is for the substitution.  
The 2<sup>nd</sup> mark is for the rearrangement.  
The 3<sup>rd</sup> mark is for the answer.  
In straightforward calculations, the correct final answer is sufficient to score all marks.  
For this question a negative sign before the numerical answer was ignored.
- 08.4** Only 64% of students scored this mark. The equations sheet was provided for this exam series. The equation with efficiency related to power was not creditworthy.
- 08.5** 76% of students scored 3 marks for this calculation question.

### Question 9 (Standard Demand)

- 09.1** The answer needed to refer to the iron block's temperature rather than anything else the student focused on, such as air temperature. An answer referring to 'it' was taken as meaning the iron block as the subject of the question. 11% of students scored the mark.
- 09.2** A question that discriminated well, with 17% of students scoring 4 marks, while 13 % of students scored 3 marks by using an incorrect temperature change. Students struggled to read the temperature change from the graph, ignoring the times given in the question. If a student assumed that the temperature change was 60°C, an answer of 216.6 would score 2 marks, whereas 216.7 would score 3 marks. 48% of students scored 0 marks.  
If an incorrect temperature change is used it should be clear what values the student has used, either by drawing lines or by quoting data. The exception to this is if they use a temperature change of 60°C (final minus initial temperature on the graph). This would need no indication of what had been done. If they use a temperature instead of a temperature change they score zero.
- 09.3** 32% of students scored 2 marks, while 59% of students scored 1 mark for identifying the effect of adding insulation.

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**Question 10 (Standard Demand)**

- 10.1** Very few correct answers, only 2% of students scored a mark. Many students gave answers in terms of charge flow and current which were insufficient. The specification does not mention alternating or direct current, only alternating or direct p.d. Answers like 'the potential difference flows in one direction' were insufficient to score.  
. Saying the potential difference only travels/goes in one direction was insufficient, as this suggested charge flow. Saying that 'the potential difference is always positive' or 'the potential difference doesn't go negative' were creditworthy. 'The potential difference is in one direction' was creditworthy. 'The potential difference isn't alternating' was insufficient.
- 10.2** 95% of students scored this mark. The equations sheet was provided for this exam series.
- 10.3** 74% of students scored 3 marks. The most common mistake was to multiply the energy and the pd, which scored zero.
- 10.4** 64% of students scored 3 marks. Students should appreciate that the first mark in a calculation is for the substitution, not the rearrangement. The substitution into an incorrectly rearranged equation scores zero. A substitution into an equation could score one mark even if the next step was an incorrect rearrangement.
- 10.5** Students made simple statements about the particle movement or particle arrangement, but usually made mistakes which stopped them scoring marks in Level 2. To score in Level 2, students needed to make comparisons of the movement and arrangement of particles in ice and liquid water. In addition to this, for students to score in Level 3, they needed to discuss either the change of state at constant temperature increasing the potential energy of the particles or how the warming of liquid water increased the kinetic energy of the particles. For 6 marks, both these aspects needed discussion. Students found this question difficult with less than 1% scoring 5 or 6 marks and 14% scoring 3 or 4 marks.

### **Mark Ranges and Award of Grades**

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