



GCSE PHYSICS

8463/2F Paper 2
Report on the Examination

8463/2F
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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 use in the equation.

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

01.1

76% of students correctly identified the extension of the spring.

01.2

56% of students scored this mark. The most common correct responses were 'wear goggles' or stand up/back from the equipment. Incorrect responses would often describe a dangerous situation rather than a safety precaution to be taken.

01.3

93 % of students scored 2 marks for calculating the weight. It was clear that some students did not have calculators for the exam. This was a major disadvantage.

01.5

92 % of students scored 2 marks and 2.5 % scored 1 mark for this calculation of the spring constant..

02.1

22 % of students scored 1 mark and 61 % of students scored both marks for identifying the energies

02.2

The majority of the students identified the correct relationship between the speed and the braking distance. Those that didn't described the graph rather than mentioning braking distance or speed, or used incorrect phrases eg 'directly proportional'.

02.3

84% of students knew that braking distance increases when a road becomes icy.

02.4

This 3-mark question required students to calculate the change in velocity then use this correctly to determine the time taken. Many students failed to show how they calculated the change in velocity and could not be awarded any marks.

02.5

86 % scored 2 marks for calculating the resultant force. Common mistakes involved dividing instead of multiplying, or calculating 1600×0.25^2 , the squared apparently being inferred from the unit of deceleration (m/s^2).

02.6

77% of students were able to identify the control variable for the investigation.

02.7

Many students correctly stated that there would be a greater number of results, which could lead to a change in the mean. But some simply stated that different people have different reaction times. Credit was also given for those that stated the reaction times of 3 children tested may not be representative of the whole class. However, some only answered by saying 'only 3 children were tested' which was insufficient to get the mark.

02.8

30 % scored 1 mark and only 33 % scored 2 marks. Rather than describing a change to the experiment students would state how they thought music would affect the reaction time, or why music would affect the reaction time.

Many who got 1 mark suggested they did the experiment with music on but did not say to compare with previous results or do it with music off.

03.1

Many students confused the arrows with the direction of current.

03.2

Almost 88% of students knew that increasing the current in the wire would increase the strength of the magnetic field.

03.3

62% identified the correct magnetic field pattern for a solenoid.

03.4

Most students identified the correct sequence, or got a mark for identifying the first and last letters correctly.

03.6

Most students calculated the period correctly.

03.7

75% of students recognised an area of compression in a longitudinal wave.

04.1

90% of students recognised the reason why a new scientific model would need to be introduced.

04.2

Some students gained all four marks through well-structured comparisons between the models. Those who listed features that were unconnected gained a maximum of 2 marks. Some students did not achieve any marks through a lack of detail in their statements.

04.3

Students were asked to state the time increases, most achieved this, a common alternative was 'it takes longer'. Many students used the table headings to successfully describe the relationship. Many who did not score made comments about the speed increasing or the distance being greater or simply said the time changes.

04.4

Most students scored 2 marks, with only 3.5% getting no marks. The most common error was not identifying the correct scale of the graph, resulting in the bars being the incorrect height.

04.5

21% of students were able to identify the order of two stages in the life cycle of the Sun correctly. 19% were able to identify all three stages in the correct order.

04.6

57% of students knew that black bodies are the best emitters of radiation.

05.1

48% of students recognised the wavelength of a transverse wave.

05.2

47% of students recognised the correct amplitude of a transverse wave.

05.3

93% of students knew that radio waves are used for communication.,

05.4

The majority of students calculated the distance correctly

05.5

The majority of students scored this mark. The most common correct answer was heating food. Common incorrect answers included TV and computers.

06.1

50% of students knew that a wide beam of light makes it more difficult to judge where the centre of the beam is.

06.2

Many students found completing the path taken by the ray through the block very difficult very difficult, with many scoring no marks. Some treated the normal line as mirror and drew a reflected ray either inside the block or against the edge of it.

06.3

21% of students were able to identify the resolution of the protractor.

06.4

The vast majority of students were able to calculate the mean.

06.5

Only 25% of students gave the correct word 'absorbed'. Common incorrect answers included blocked, emitted, filtered, reflected and refracted.

06.6

The vast majority of students gave the correct equation. For those few that didn't score, it was most frequently because they did not attempt the question, in spite of having the formula sheet.

06.7

A significant number of students scored 2 marks because they could not calculate the powers of ten correctly, giving an answer of 7.5×10^{21} . A number of students scored no marks because they showed an incorrect rearrangement but omitted to show the substitution step first.

07.1

75% of students knew that satellite is the name given to an object that orbits a planet.

07.2

A significant number of students did not attempt this question. This is common when students are asked to complete a diagram. Many did show an arrow from the Hubble Space Telescope to Earth. Some drew multiple arrows. A lack of precision from where the arrow started prevented some students from scoring the mark.

07.3

53% of students scored full marks on this calculation of speed from a distance–time graph. The most obvious way of doing this was to use the full gradient which gives 38km in 5 seconds, which was the most common method used by the students. However, many students took different intervals along the line and provided they used the correct numbers the calculation was accepted. This meant a range of velocities could be derived. Common ones were 15km in 2s, 4km in 0.5s,

23km in 3s. 8% scored one mark for correctly identifying a change in distance with the corresponding change in time.

07.4

65% of students could identify the galaxy moving away from Earth the fastest from the light spectra.

07.5

77% of students could identify the galaxy furthest away from Earth from the light spectra.

07.6

74% of students understood why it is important that scientific observations are peer reviewed.

08.1

Only 12% of students could name the principal focus. The most common wrong answer was focus point.

08.2

The vast majority of students did not attempt to complete the ray diagram or scored zero. Many student drew multiple rays from various parts of the diagram in all directions. Even fewer identified where to draw the correct image. X % of students scored 2 marks, while X % of students scored 1 mark.

08.3

Most students gave similarities of the ray diagrams rather than the images.

08.76% of students obtained all 3 marks. Of those who didn't, some started with an incorrectly rearranged equation and thus scored zero. The most common error was dividing the magnification by the object height, instead of multiplying, to get the image height.

09.1

12% of students gave the answer perpendicular or a correct description of perpendicular. Common incorrect responses included parallel, opposite, and proportional.

09.2

29% of responses were level 1 and 45% were level 2. Very few students explained the need to calculate the temperature change or to compare the readings on infrared detectors. A number of students suggested using cold water, or even described a different practical. Students were not penalised for using tiny volumes of water, but many students have no concept of how much 50 ml is, for example.

09.3

Many students scored zero as they had selected the incorrect box. The reason had to state greatest/highest temperature, or the liquid was the hottest. A higher temperature or hotter liquid was insufficient to gain this mark. 21% of students scored both marks.

09.4

31% of students gained this mark. There seemed to be confusion as to which variable was the dependent variable. The majority of students gave control variables or the independent variable as their answer.

09.5

The most common response related to the matt black surface and the shiny white surface. This was awarded 1 mark. Some students did mention that black was the best absorber but failed to adequately describe the relative absorbance of matt versus shiny surfaces, as they did not explain this only applied for the same colour surface. Some students gave their response in terms of emission or reflection of IR radiation, both of which scored zero. Only 2% of students were able to give two meaningful conclusions.

09.6

90% of students correctly identified the formula for calculating pressure.

09.7

47% of students achieved full marks in this calculation. Many scored zero, as they calculated the total surface area, the volume or used the length of the cube.

10.1

Only 9% of students calculated the displacement correctly. Those who did not gain the mark simply measured the route taken by the aircraft and scaled that distance up. A small minority didn't attempt the question.

10.2

27% of students gained the mark for the resultant force. Some missed out a force, others did not know how to combine the forces.

10.3

6% of students, who calculated the resultant force correctly, also scored this mark. Very few correctly described the motion using simplistic descriptions like moving forwards or moving slowly, rather than describing the motion in terms of velocity speed and acceleration. It was common to see the aircraft was "stationary", even though the question says it is moving.

10.4

Some students confused energy and force. It was common to see non-contact forces given. 20% of students could name an additional contact force.

10.5

6% of students scored 1 mark, usually for drawing an upward line/curve from 10s. Only 23 % of students scored 2 marks.

10.6

A minority of students attempted to draw a smooth curve and extrapolate this to the 10km line. Those who did generally obtained full marks by using the graph correctly, with 12% of students scoring both marks. A number of students miscalculated the scale on the graph and quoted incorrect values from their line. It was more common to see a straight line, which often allowed the award of 1 mark for a correct reading of the value.

10.7

50% of students knew that as the height of the aeroplane above the ground increased, the average density of the air decreased.

Mark Ranges and Award of Grades

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