Questions matter

GCSE
Physics

8463/2F Paper 2 Foundation Tier

Report on the Examination

8463
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Foundation Tier

Students had access to the Physics Equations sheets for this examination series.
It was encouraging to see an improvement in calculation questions, but disappointing at the number of responses left blank for questions that required more than a simple answer.

Students who did not use the correct terminology struggled to explain things adequately.

There is an issue with a significant number of students who think that a value with a square or cubed in the unit needs to be squared / cubed. For example, an area of 49 m^2 becomes 49^2 when substituted into the equation.

01.1
98% of students could name our galaxy correctly.

01.2
This question was well answered with 80% of students knowing what the Sun was formed from.

01.3
70% of students were able to name a force involved in the formation of the Sun.

01.4
There was some confusion about the process which releases energy in stars, with only 56% choosing fusion. The most common wrong answer was combustion. Very few students did not attempt this question.

01.5
This question proved more challenging, with only 15% of students understanding that all types of electromagnetic radiation travel at the same speed in a vacuum or space.

01.6
53% of students knew that infrared radiation has a greater frequency than visible light.

01.7
This question was well answered with 49 % of students scoring one mark for knowing that the Sun emits infrared radiation at a greater rate than Earth and a further 34% of students scoring both marks because they could give a reason why.

02.1
33% of students were able to identify cobalt as a magnetic material. Copper was a common wrong choice.

02.2
22% of students scored both marks and 46 % scored one for showing the direction of the magnetic field in the circles. Despite clear instructions, many students put their arrows on the magnetic field lines

02.3
46% of students knew where the magnetic field was strongest.

02.4
Most students choose identified the correct arrangement of the bar magnets.

02.5
This proved to be a very difficult question. Students often thought that the compass needle pointed in the direction of the current. Only 7% scored 2 marks. Approximately 16 % of students did not attempt this question.

02.6
Most students knew that decreasing the current would decrease the strength of the magnetic field.

02.7
Many responses to this question were unclear or vague. Students do not understand that the magnetic file around a straight wire does not have poles.

03.1
27% of students answered this question about force correctly.

03.2
Those scoring marks tended to get the dependent variable correct, as opposed to getting the independent variable. Only 23% gained both marks. A significant minority could not identify either correctly or drew more than one line from each box to different answers.

03.3
86% scored both marks for calculating the mean acceleration. The clarity of writing numbers was an issue with some responses, where a '1' could be confused for a '2', or a '5' for a '6' or '3'. Taking more care in writing answers would benefit some students.

03.4
Most of the students identified the correct relationship between the two factors. Those that did not score this mark said the factors were 'directly proportional', or that as one decreased the other decreased.

03.5
90% scored full marks for this calculation of resultant force. A common error was to multiply 1.5 by 0.62^2, the squared value incorrectly being moved from the unit to the number.

04.1
Only 28% of students identified the amplitude of the wave correctly. The most common incorrect response was option A, which was double the amplitude.

04.2
Most students knew which arrow represented the wavelength of the wave.

04.3
Most students got full marks for this calculation of period, and expressed the answer as a decimal or in standard form. A significant number tried to convert from standard form into a decimal value and were unable to do so correctly

04.4
39% of students correctly answered, giving an electromagnetic wave. The most common incorrect answer was sound.

04.5
50 % of students identified the rarefaction in a longitudinal wave correctly.

04.6
49% scored both marks for this calculation of wavelength. Those that didn't often substituted the numbers the wrong way round.

04.7
There were a wide range of answers, with a minority of students providing a valid method to determine the speed of sound and reaching level 2. Most students got the idea of making a sound, the better responses had a way of making a short sharp sound. Many were unsure of the distance required for the experiment to work, and descriptions of how the timings will occur were often vague. The better responses indicated when the stopwatch would be started and when it would be stopped.

04.8
Most attempted this question, but a minority concluded that when going from air to water the wavelength of a sound wave increases.

05.1
37% of students identified two scalar quantities from the list, and. 40% could identify one.

05.2
87% of students were able to read the correct value from the distance-time graph.

05.3
Most students correctly used their answer from 05.2 to calculate the average speed.

05.4
Only 2% of students scored both marks, as many found it difficult to explain why they had chosen the correct section of the graph.

05.5
Many students scored this mark about doing work against gravity.

05.6
79% of students scored this mark for recalling the typical running speed of a person.

06.1
Many responses for this question were too vague. The questions asked for equipment that can be used to detect infrared waves, so responses that involved emitters of IR waves were incorrect. A significant number focussed on the word radiation and gave their response as a Geiger counter.

06.2
23% of students interpreted the information correctly and chose the correct wavelength.

06.3
A correct response required the use of the information given to identify differences between the sight of bees and humans. Simply quoting wavelengths that could and could not be detected was not sufficient. A minority of students gained marks.

06.4
This question was about white light shining onto a coloured flower. A significant number of students chose the correct words but not always in the incorrect order.

06.5
60% of students were aware of the affect a filter has on the appearance of a coloured object.

06.6
Less than 2% of students were able to name diffuse reflection.

07.1
Only a few students failed to gain 2 marks in this calculation of weight. Some had not substituted correctly, others tried to convert mass to grams.

07.2
58% of students scored all 3 marks for this calculation of pressure. The unit of area being m^2 seemed to confuse some students into squaring 49. Those scoring 2 marks tended to give an incorrect unit.

07.3
61% of students knew that the pressure in a fluid causes a force normal to the surface.

07.4
Students were expected to calculate the change in velocity to find the acceleration. Many did not calculate the change but just used one of the velocities given in the question. 78% scored both marks.

07.5
A percentage calculation which proved to be too difficult for many students. A common answer was 75% instead of 25%.

07.6
Even though all students had access to the Physics Equations Sheet, 3% did not write down any equation. 7% quoted the wrong equation.

07.7
Well answered calculation of spring constant with 77% getting all 3 marks. Some students struggled to rearrange the equation. Some tried to use the elastic potential energy equation.

07.8
24% of students gained all 4 marks for this velocity calculation. Those who didn't usually did not show a full substitution into the equation, and calculated 2*as*, thinking this was the final answer.

08.176% of students gave an incorrect value of resolution for the protractor. Answers of 10, 90 and 180 degrees were commonly seen.

08.2
Only 41% of students gained any marks for this description of a practical investigation about the refraction of light. There was confusion, or lack of detail, when describing the angles to measure. Many forgot to include a normal line. A small number of students had not read the question carefully and described reflection by a mirror.

08.3
47% of students plotted points on the graph correctly, and drew a curve, to show the relationship between the angles of incidence and refraction. 40% of students drew a straight line of best fit. This is connected to the misconception that a line of best fit is always straight.

08.4
Many students stated that the line was curved even though they drew a straight line in **08.3** or said that the points don't go through the line of best fit. This was incorrect, but was because they had drawn an incorrect line of best fit.

08.5
Many students tried to draw the path of the reflected ray of light by eye rather than using a protractor to measure the required angles. Very few drew the normal line, as directed in the question, those that did tended to do it correctly. 9% of students scored both marks and 23% gained 1 mark.

08.6
50% of students were able to identify the correct pathway for a ray of light being refracted through a denser medium.

09.1
42% of students correctly gave the resultant vertical force on the child as 0N, but then failed to score the second mark point, as they stated that the child is not moving or there is no force acting. Only 3% understood the concept that a stationary object has forces acting on it, but those forces are balanced.

09.2
93% of students managed to write down the correct equation for the moment of a force.

09.3
A well answered calculation of force, with 74% of students gaining all 3 marks. Some students tried to convert the units.

09.4
Only 0.5% of students scored 2 marks for explaining why the speed of the baby walker increased as the baby moved onto the hard floor, and 52% scored 1 mark. Most students understood that the friction was less on the hard floor but did not go on to describe what happens to the resultant force.

09.5
93% of students chose the correct equation for the moment of a force.

09.6

This calculation of the moment of the force was well answered with 14% of students scoring all 3 marks. About 72% forgot to convert the cm to m, or made a mistake converting, and scored 2 marks.

09.7

This question related to interaction of two gears. Of those that scored marks, most got the first mark point for stating the gears moved in opposite directions, with the minority discussing the different speeds. Very few achieved the second mark point. For those who did, it was for stating gear A exerts a force on gear B. A few attempted to explain it as gear A causing a moment about the pivot of gear B but some mentioned momentum instead of moment, thereby causing confusion in the response.

Mark Ranges and Award of Grades

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