GCSE

SCIENCE A / PHYSICS

PH1FP

Report on the Examination

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General

Questions 1 to 6 were low demand, targeting grades E, F and G. Questions 7 to 9 were standard demand, targeting grades C and D.

Apart from the QWC question 9(a), the paper as a whole seemed accessible to the majority of students; with very few unattempted items.

Poor communication skills or confusion over scientific terms were often more of a problem to students than a lack of understanding of the physics principles.

Some students attempted to answer some of the questions by simply rephrasing the words in the stem.

In questions where the students were asked to 'explain', the answer was often a simple statement or description. Students should be reminded that if the question contains the word 'explain' their answer should usually include the word 'because'.

The legibility of the answers seemed to be poorer this year compared to previous years. Students should be reminded that the examiner needs to be able to read what they have written.

Question 1 (Low Demand)

(a) (i) Only about one third of the students were able to answer this question correctly, although most attempted a calculation. The problem would appear to be that most students did not realise which of the energy sources were fossil fuels. The most common answer was 93%, i.e. adding up all of the energy sources apart from renewable.

(a) (ii) Most students were able to identify oil as being the energy source that is not renewable.

(b) About half of the students knew that fossil fuels are burned to heat water.

(c) Although most of the students knew that carbon dioxide causes global warming, some thought that carbon dioxide is the main cause of acid rain.

Question 2 (Low Demand)

(a) (i) Most students realised that traffic lights communicate using visible light.

(a) (ii) Most students thought that satellites used radio waves for communication rather than microwaves.

(b) About two thirds of the students correctly identified position **J** as being gamma rays.

(c) (i) Most students correctly identified **B** as showing the wavelength.

(c) (ii) Most students knew that the wavelength of infrared waves is shorter than the wavelength of radio waves.

(d) (i) Most students realised that scientists were trying to find out if using a mobile phone is harmful to health, although a significant proportion thought that it was to find out if mobile phones give out radiation.

(d) (ii) Although many students were able to score both marks in this question, about half of them only scored one mark, either for explaining that mobile phone **X** would cause a smaller amount of energy to be absorbed by the head or that mobile phone **X** would be safer. Some students thought that the SAR value showed how much energy the phone itself absorbed.

Question 3 (Low Demand)

(a) Most students thought that the image would be at position **B** rather than position **C**.

(b) Most students could show a ray reflected from the mirror but not all were able to show it reflecting at an appropriate angle. Although most students put arrows on the rays, in many cases these showed the light to be emerging from the eye.

It was pleasing to note that the great majority of students used a ruler to draw the rays.

(c) Most students knew that the image was virtual. The most common incorrect answer was “imaginary”.

Question 4 (Low Demand)

(a) (i) By far the most common answer to this question was “to make it a fair test”. This is not sufficient. Only about 20% of students realised that if the distance was altered this would affect the speed of the wind reaching the turbine blades.

(a) (ii) Slightly fewer than half of the students realised that it would be necessary for the reading on the voltmeter to stabilise before taking a measurement. A significant proportion of students thought that the fan must be switched off and it was necessary for the turbine blades to stop spinning before taking a reading.

(a) (iii) The majority of students could state that as the number of blades increased, so did the output voltage. However, only the better students went on to explain that there was a limit to the output voltage. Some students thought that the turbine was responsible for producing the wind.

(b) About half of the students correctly identified graph **C** as being the one that represented the output from the wind turbine. However, only the better students could provide an acceptable reason for this choice. Some students thought the graphs showed how demand for electricity varied throughout the day.

Question 5 (Low Demand)

(a) (i) About half of the students knew that sound waves cause the air particles to vibrate. A common answer that was insufficient to gain a mark was simply to say that sound waves caused the air particles to move.

(a) (ii) The majority of students could correctly complete the calculation to find the speed of the waves. The most common mistake was to divide 420 by 0.8 instead of multiplying.

(b) (i) Fewer than half of the students knew that it is the frequency that determines the pitch of a sound. The most common incorrect answer was "amplitude".

(b) (ii) Fewer than half of the students knew that the wavelength would be longer than 0.8 m.

(b) (iii) Most students could identify the effect as being the Doppler effect.

Question 6 (Low Demand)

(a) (i) Although most students could describe the pattern as being linear, very few referred to the fact that the graph showed direct proportionality.

(a) (ii) There were very few correct answers to this question. A few suggested it took time for the heater to warm up but other acceptable answers were rarely seen. Many stated that the difference was because the first graph was a "guess" and the second was a "real" result. There was a lot of discussion about the original room temperature and some thought that since the student was reading the temperature every 50s, they had to switch off the heater whilst they were doing this.

(a) (iii) The majority of students could correctly complete the calculation to find the energy transferred.

(b) The majority of students chose aluminium rather than lead, presumably because it had the highest specific heat capacity. Of those who did select lead, very few were able to provide an adequate reason.

(c) (i) Most students were able to score both marks in this question.

(c) (ii) There were few correct answers to this question. The most common method was to multiply the two numbers and thereby end up with a figure of 192 years for the pay-back time.

Question 7 (Standard Demand)

(a) Very few students appreciated that the waste energy from the power station would cause an increase in temperature of the surroundings. Of those who were thinking along these lines they often stated that the waste energy from the power station would cause global warming. Many students thought that the waste would be in the form of gases and were therefore talking about pollution of the environment.

(b) The best students were able to correctly calculate the efficiency of the CHP station. However, some of these failed to gain maximum marks because either they neglected to insert the % sign after the number 80 or they quoted the efficiency as 0.8 but then put a % sign or a unit after the number.

(c) About half of the students gained one of the two marks on this question.

(d) (i) Very few students knew that the National Grid comprises cables and transformers; the majority thought that it comprised cables and pylons.

(d) (ii) Few students could provide an adequate reason for the increased efficiency. Responses such as “the electricity doesn't have to travel far”, “it's quicker/cheaper” and the use of “electricity” rather than “energy” meant that many scored no marks.

Question 8 (Standard Demand)

8 (a) This question discriminated well, with the best students scoring all three marks. However, there was much confusion about terminology with the terms condensation, convection and evaporation apparently interchangeable in many answers. The most common way of gaining a mark was to say that condensation was occurring. The verb “to condensate” was almost universal.

8 (b) Most students realised that condensation would not take place, although condensation followed by evaporation from the mirror surface was common. Many thought that warm air was “attracted” to a cold surface. Others did not state that the mirror was warm and simply repeated the “heated mirror” from the stem of the question. As in part (a) the meaning of “evaporation” and “condensation” was not clear.

Question 9 (Standard Demand)

(a) This question incorporated the assessment of the Quality of Written Communication. The responses were, on the whole, disappointing. Many tried to answer this item without even mentioning conduction, convection or radiation. A sizeable minority simply listed the labelled parts of the diagram and after each stated that they stopped heat movement without stating what method of heat transfer was being affected or what it was about the component that was useful in this regard. It was obvious that many did not know what a vacuum was.

(b) Only half of the students scored any marks on this question. Many appeared to know what was going on here but could not make their ideas clear enough to gain marks. “Surface area” was often missed out. Other students suggested that it was “cold” that was moving rather than “energy” or “heat”. Common errors included “small ears made covering by fur easier”, “small ears wouldn't flap and cool down the fox” and “small ears enabled the fox to hold them close to their body for warmth”.

Mark Ranges and Award of Grades

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

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator