



Examiners' Report

Principal Examiner Feedback

November 2021

Pearson Edexcel GCSE Combined Science

(1SC0) Paper 2PF

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Candidates generally found that the mathematical questions more accessible. Questions which required a description of how practical work was carried out or an explanation were generally found to be more demanding.

#### Question1

(a) Most candidates were able to gain at least two marks by correctly drawing the circuit symbol for at least one of the electrical components and making a complete circuit. Only a few candidates were able to achieve all four marks.

(b) Almost all candidates showed substitute into the equation and evaluate the voltage correctly.

(c) The value of 1.4A on the ammeter was read correctly by most candidates.

#### Question2

(a) All candidates identified the wooden ruler as being non-magnetic but a significant number did not recognise that the compass needle was a permanent magnet and that the nail in a current carrying coil was temporary as the nail ceases to be a magnet when there is no current in the coil.

(b)(i) There were very few diagrams that showed concentric circles about the wire or any circle with the wire at the centre.

b(ii) Without a circle being drawn then no mark could be awarded for the arrow.

(c)(i) Most candidates were able to correctly plot the points to within a square

(c)(ii) To gain the mark for the best fit curve the curve must be smooth and drawn so that the curve is close to all of the points. Points must not be joined using a ruler.

(c)(iii) Only about half of the candidate were able work out the change in the strength of the magnetic field when the distance varied from 4cm to 8cm. This was best done by adding lines to the graph from the distance axis and then reading off the strength of the magnetic field at each distance and subtracting.

(c)(iv) As the question stated that the distance from the wire affects the strength of the magnetic field the only other factor to cause an effect is the current in the wire. Very few candidates gave this answer.

#### Question 3

3(a) Many of the candidates did not convert kilowatts to watts for use in the equation and therefore only achieved one mark for the substitution. There were a few candidates that

did not recognise  $I$  as the symbol for current in the equation and unnecessarily rearranged it.

a(ii) Not all candidates were able to select the correct equation from the list at the end of the paper. Those that did select the equation generally were able to evaluate correctly.

b(i)-b(ii) Candidates generally could not identify the wiring or components of a mains plug, of those that did identify the 'live' wire it was quite frequently mistakenly referred to as the 'life'.

(c) Candidates were rarely able to evaluate the input current correctly. The values were often shown above the written equation on the paper and quite often the output power was calculated. However rearranging the equation to find the input current often proved to be too difficult.

#### Question 4

(a)(i) The majority of candidates were able to substitute in the given equation and evaluate.

(a)(ii) Generally one mark was achieved for giving that the energy was transferred, decreases or dissipated. Energy wasted was not accepted. Candidates found it more difficult to explain where the energy had gone to or to what form of energy it had become.

(b) Some candidates were able to select the correct distance of 6.3m but could not explain that this was the distance moved to calculate the work done because it is in the direction of the force pushing the box.

(c) Most candidates completed a calculation but forgot to convert grams to kilograms when inserting values into the equation. The other common mistake was not squaring the value of velocity.

#### Question 5

(a) It was apparent from the variety of answers that many candidates did not recognise the circuit components as variable resistors.

(b) Most candidates knew that one meter was in series and the other in parallel in the circuit but were not able to identify which.

(c)(i) The majority of candidates were able to gain one mark for describing that as the potential difference increases so does the current. A reference to the idea that the gradient of the graph is decreasing is necessary to gain the second mark. This can be the graph is non-linear, not directly proportional or  $V$  increases at a decreasing rate.

(c)(ii) Most candidates were able to determine the values of voltage and current from the graph

(c)(iii) No candidate gained two marks as the current given in mA was not converted to amps in the calculation.

(c)(iv) A few candidates were able to gain one mark for identifying that the change in resistance is an increase. An explanation linked to the heating of the filament or more collisions of electrons was rarely seen.

#### Question 6

(a) Two marks were rarely awarded. Candidates must use two comparisons to gain both marks. e.g 1. particles in a solid are closer together than in a liquid, 2. Particles in a solid are regularly arranged in a liquid the arrangement is random.

The most popular incorrect answer was that particles in a solid 'do not move', vibration is movement.

(b) Many candidates were either unable to calculate the volume or did not recognise that the V in the equation was volume. Those candidates that were unable to determine the volume correctly could gain a mark by showing use of the equation.

(c) Most candidates suggested the use of extra cladding, increasing the thickness of the walls or closing window and door properly.

(d) A few candidates were able to achieve a level 3 by planning to measure length, width and thickness of each strip, measuring mass and then using equation,  $\text{density} = \frac{\text{mass}}{\text{volume}}$  to compare densities.

A few candidates measured the volume by immersion in a liquid contained in a measuring cylinder which was equally acceptable

The majority of candidates, however, only achieved level 1 having planned only to take some length measurements with a ruler or find the mass using a balance.