



# **Examiners' Report**

## **June 2024**

**GCSE Combined Science 1SC0 2PH**

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## Introduction

With minimal disruption to learning over the past two years candidates should have been able to carry out the full range of practical investigations as indicated in the specification to support their learning experience. An Equation booklet giving all of the equations was included in the specification and was issued to candidates with the examination paper. The following topics were tested in the examination:

Topic1 Key concepts in Physics

Topic 8 Energy – forces doing work

Topic 9 Forces and their effect

Topic10 Electricity and circuits

Topic 12 Magnetism and the Motor effect

Topic 13 Electromagnetic induction

Topic 14 Particle Model

Topic 15 Forces and matter

Candidates showed themselves to be proficient in completing calculations although rearrangement of equations does still cause some problems. However, there were many power of ten errors because of incorrect conversion of units. The majority of candidates are familiar with setting up circuits and know where ammeters and voltmeters should be positioned, although they are not as certain of the effect on resistance of using resistors in parallel. Many candidates also showed a lack of understanding of the magnetic field of the Earth. Candidates also need to make more use of diagrams either by adding to them or drawing them as this helps to make a coherent explanation and is a good basis for describing an experiment.

### Question 1 (b)(i)

More than half of the candidates were able to draw a voltmeter correctly in position in parallel in a circuit which was given, to measure the voltage across a panel of resistors.

The response shows a possible placement of the voltmeter.



**ResultsPlus**  
Examiner Comments

The voltmeter must be in parallel with the resistors at any point on either side of the resistor panel so can be connected.



**ResultsPlus**  
Examiner Tip

Remember voltmeters are put in parallel.

## Question 1 (b)(ii)

Most candidates were able to complete the table given by showing the current in the circuit with four resistors and recognising that the current was increasing by 9.1 mA for the addition of each resistor.

The example shows the correct answer given in the table, with the incorrect value for the current given on the answer line.

number of resistors	current in mA	voltage in V
4	36.4	6.00
3	27.3	6.00
2	18.2	6.00
1	9.1	6.00

$$36.4 - 27.3 + 18.2 + 9.1 = 91$$

current = 91



**ResultsPlus**  
Examiner Comments

This response does not score a mark. It is the answer on the answer line that is marked as the evaluation.



**ResultsPlus**  
Examiner Tip

Remember it is the answer on the answer line that scores the mark.

### Question 1 (b)(iii)

This question required candidates to calculate the resistance of one of the resistors shown in the circuit. Only a few candidates were able to score all three marks although about half of candidates did score two marks due to a power of ten error. The most common errors were, not selecting the current and voltage for just one resistor from the table, not converting milliamps to amps and being unable to rearrange the equation  $V=I \times R$  to find R.

This response shows the correct evaluation of the resistance of one resistor in the circuit.

$$\begin{aligned} V &= I \times R \\ 6.00 &= (9.1 \times 10^{-3}) \times R \\ 6.00 &= R \\ \hline 9.1 \times 10^{-3} \\ 659.340659 &= R \end{aligned}$$

$1000 \text{ mA} = 1 \text{ A}$   
 $9.1 \text{ mA} = 9.1 \times 10^{-3} \text{ A}$

resistance = 659.3



**ResultsPlus**  
Examiner Comments

3 marks are awarded.

The correct equation is chosen. The values of voltage and current are substituted with the current converted from milliamps (mA) to amps. The equation is rearranged to make R the subject and the value of R is evaluated.



**ResultsPlus**  
Examiner Tip

Remember to convert milliamps to amps for use in the equation.

This example shows the most common error for this calculation.

$$V = I \times R$$
$$R = \frac{V}{I}$$

$$R = \frac{6}{9.1}$$
$$= 0.659340\text{...}$$
$$= 0.66$$

resistance = ..... 0.66



**ResultsPlus**  
Examiner Comments

Two marks are awarded because milliamps have not been converted to amps, giving a power of ten error!



**ResultsPlus**  
Examiner Tip

Show your working clearly to gain some marks even though the answer is not correct.

## Question 1 (b)(iv)

This question requires candidates to explain what happens to the total resistance in the circuit when the number of resistors in parallel is decreased, and to use data from the table to do this. Only a few candidates were able to score all three marks. The table shows a constant voltage applied to the circuit and as the number of resistors decreases the current decreases. Therefore, applying  $V=I \times R$ . If the current decreases the resistance in the circuit must increase as the value of voltage is constant.

This response uses the data but does not answer the question.

As seen in figure 3, the less resistors you have the less current. However in parallel the amount of voltage stays the same as it doesn't need to be split. We can see this in figure 3 because at 3 resistors the current is 27.3 amps and voltage is 6.00. Whereas at 1 resistor current is 9.1 and voltage is at 6.00. So no change in volt



2 marks were scored.

The table is used and the decrease in the current is noted, as is the constant voltage. However, the question asks for what happens to the total resistance in the circuit and this is not mentioned.

If 'the resistance of the circuit therefore increases' was added, this response would score three marks.



Make sure and check that you actually answer the question.

This is an answer with a complete explanation.

The total resistance of the circuit would increase as the number of resistors in parallel decreases because the voltage stays the same however the current decreases as the number of resistors decreases which would make the resistance greater. (Total for Question 1 = 9 marks)



**ResultsPlus**  
Examiner Comments

3 marks scored

'the total resistance of the circuit would increase' scores the first marking point:

'voltage stays the same' is the third marking point.

However, the current decreases scores the second marking point.




**ResultsPlus**  
Examiner Tip

By using the table, information on current and voltage is given, but it is only the resistance which is not given and can be worked out if it is not already known.

## Question 2 (a)

Many candidates were able to score all three marks for this calculation. The equation for density was given but needed rearranging to evaluate the volume.

This response shows the three marks awarded for substitution, rearrangement and evaluation.

$$8.96 = \frac{14.1}{v}$$

$$\text{volume} = \frac{\text{mass}}{\text{density}} = \frac{14.1}{8.96} = 1.5736$$

$$\text{volume} = \dots\dots\dots 1.5736 \text{ cm}^3$$



3 marks scored

The substitution rearrangement and evaluation are clearly shown.

The appropriate number of significant figures was not required, but the values given are all to three significant figures so three significant figures in the answer line would be appropriate rather than four.



Show each stage of the calculation in your working.

## Question 2 (b)

A table is given to show the density of solid and liquid aluminium in  $\text{gm/cm}^3$

Candidates were asked to explain the difference in density in terms of the arrangement of particles. Only about a third of candidates were able to score both marks. The first marking point was using information from the table to show that the liquid aluminium was less dense. To gain the second mark it was necessary to conclude that as the liquid was less dense the particles must be further apart.

This answer gives the reverse argument.

The density of solid aluminium is greater than liquid aluminium meaning that the particles in the solid aluminium are packed closer together than in the liquid aluminium.



**ResultsPlus**  
Examiner Comments

The first marking point is scored for 'the density of solid aluminium is greater than liquid aluminium'.

The second mark is scored for 'in the solid aluminium the particles are packed closer together'.



**ResultsPlus**  
Examiner Tip

Use the information in the table then apply your knowledge.

## Question 2 (c)

This question included the use of standard form and a conversion from grams to kilograms. About a third of candidates gained both marks and as the equation was given and no rearrangement required it was usually a power of ten error that lost the second mark for evaluation.

This example shows the most frequent error.

$$60.0 \times 2.26 \times 10^6 = 135600000$$

amount of thermal energy = 135600000 J



**ResultsPlus**  
Examiner Comments

One mark is scored because the grams are not converted to kilograms.



**ResultsPlus**  
Examiner Tip

Remember that the standard unit to use for mass is kilograms.

This response shows the correct conversion of mass of water.

$$Q = m \times L \qquad 60g = 0.06kg \qquad (2)$$

$$Q = 0.06 \times 2.26 \times 10^6 \\ = 135600J$$

amount of thermal energy = .....135600..... J



The first mark is scored for correct substitution. This example also shows that grams have been converted to kilograms correctly. The second mark is for the correct evaluation.



Practice using standard form on your calculator.

## Question 2 (d)

The measuring jug with a scale was used to test scale reading and calculation of volume of an object by displacement of water. More than half of the candidates scored both marks. The majority of candidates were able to estimate the two readings and subtract but some then attempted a further calculation because they did not realise that a millilitre (ml) is the equivalent to a centimetre cubed ( $\text{cm}^3$ ).

This response shows both readings and the subtraction.

$$1750 - 1350 = 400$$

volume = ..... 400 .....



**ResultsPlus**  
Examiner Comments

The first mark is scored for at least one reading on the scale of the measuring jug being given to within the tolerance allowed. The second mark is awarded for subtracting the readings and giving the answer to within the tolerance allowed.



**ResultsPlus**  
Examiner Tip

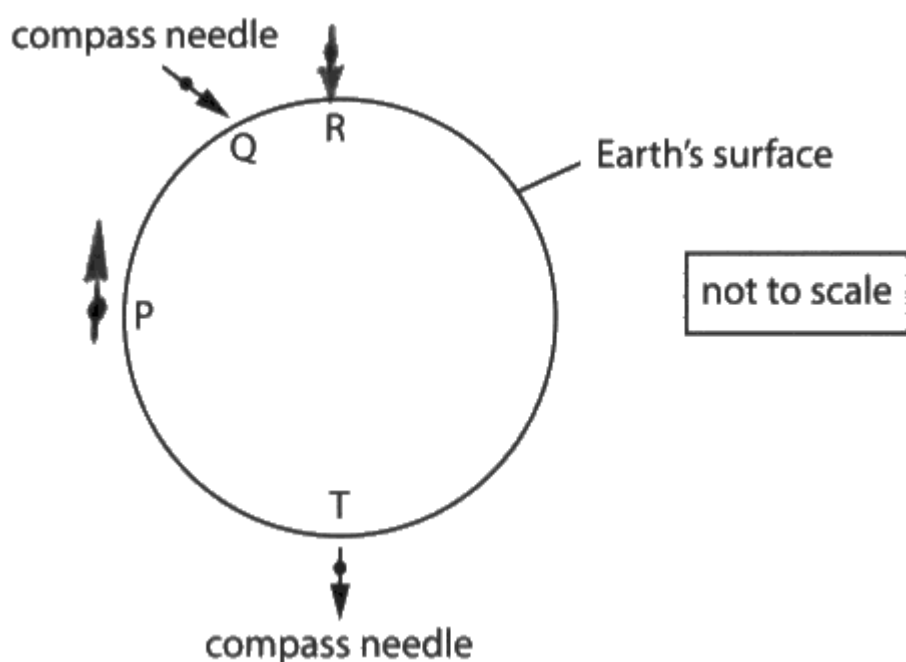
Learn that the volume of a millilitre is equivalent to a centimetre cubed.

### Question 3 (a)(i)

The question showed a diagram representing the Earth with arrows showing the direction of magnetic compass needles at two points, T and Q. Candidates were asked to show the direction that the magnetic compass needles would point at two other positions, P and R.

About half of candidates could show the direction for R as into the Earth, but many fewer were able to get the direction of the arrow at P as parallel to the Earth's surface.

Arrows representing the direction that the magnetic compass needle pointed in positions P and Q where both drawn correctly.



2 marks scored.

At point P, the arrow representing the compass needle points upwards, parallel to the Earth's surface.

At point R, the arrow points downwards into the Earth.

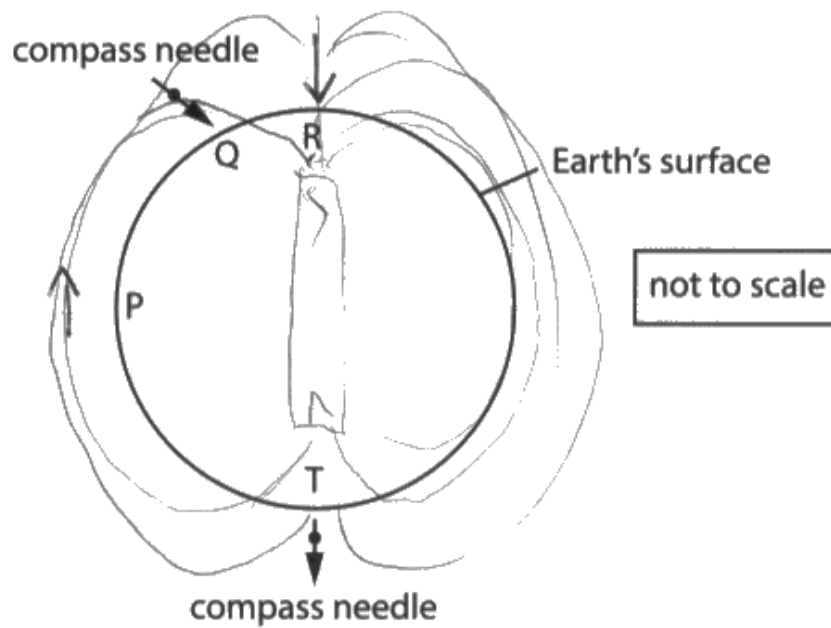


Learn the shape and direction of the Earth's magnetic field.

### Question 3 (a)(ii)

This question was best answered by adding the Earth's magnetic field to the diagram with arrows to show the direction from geographical south to geographical north. Only a few candidates were able to score all three marks for this question and many others frequently made errors either by not knowing that the magnetic compass needle pointed in the direction of the Earth's field or by confusing magnetic and geographical poles.

This response explains why the magnetic compass needles points in the direction that they do by considering the Earth's core as a bar magnet.



**Figure 6**

- (i) A compass needle is placed at point P and another at point R, near to the Earth's surface.

On Figure 6, draw an arrow at point P and an arrow at point R to show the direction of the compass needle at each point.

- (ii) Explain why the arrows point in the directions you have drawn in part (i).

You may draw on Figure 6 to help your answer.

because the magnetic field lines  
 come into south (R) and at P they are  
 circling round to R. hence why R  
 is pointing down as P is facing up.





Three marks were awarded.

The diagram shows the Earth's magnetic field with the Earth's core as a magnet. This scores the first marking point.

The arrows on the small diagram below the text clearly shows arrows pointing to a magnetic south pole for the second marking point.

The magnetic field lines go from the north to south poles of a magnet scores the third making point.



Know the shape and direction of the Earth's magnetic field.

### Question 3 (b)(i)

The diagram shows a circuit with a current carrying wire in a magnetic field. The wire has a force acting on it in the direction of the force and can be found using Fleming's Left Hand Rule. Candidates were asked to draw an arrow on the diagram to show the direction of the force on the wire. The arrow should be upwards and can be placed at any point on the wire.

An arrow is correctly shown as upwards to indicate the force on the wire.

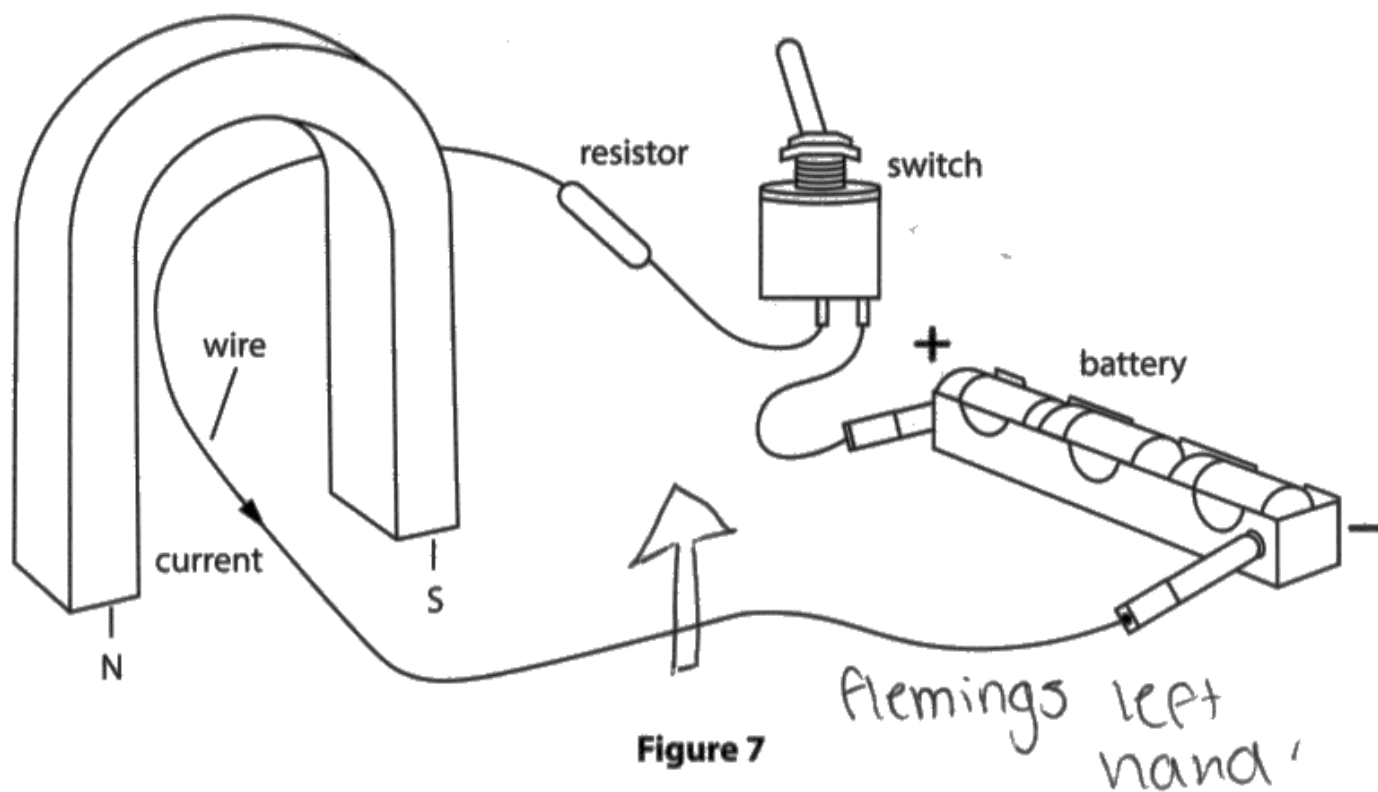


Figure 7



One mark was awarded for an arrow pointing upwards.



Know and understand Fleming's Left Hand rule to find the direction of the force on the wire.

### Question 3 (b)(ii)

Changing the direction of the current or the magnetic field, which would change the direction of the force on the wire were not acceptable answers. The question asks for a practical way of achieving this change in direction of the force on the wire. Only about half of the candidates were able to state how the change in direction of the force on the wire could be achieved.

This example clearly shows what has to be done practically to reverse the direction of the force.

Switch the battery that negative is next to the switch and positive is opposite



**ResultsPlus**  
Examiner Comments

One mark is awarded because the candidate clearly stated the answer.



**ResultsPlus**  
Examiner Tip

Read the question carefully. In this case to give a practical method ie what you would do.

This response states what would be done with the magnet to reverse the direction of the force.

Turning the magnet so the  
North and South Swap.



**ResultsPlus**  
Examiner Comments

A mark is awarded because it is clear what has to be done. Just turning the magnet would not be sufficient as there are many directions in which the magnet could be turned.



**ResultsPlus**  
Examiner Tip

Make sure your answer clearly shows how the force can be reversed.

### Question 3 (b)(iii)

The calculation relates to the current carrying wire in a magnetic field, as shown in Figure 7. Candidates had to select the equation  $F = B \times I \times L$  and rearrange it to make  $B$  the magnetic flux density the subject of the equation.

This response shows the correct equation selected and the evaluation of the magnetic flux density  $B$ .

Calculate the magnitude of the magnetic flux density between the two poles of the magnet.

$$\text{Force} = mfd \times I \times l \quad (2)$$



$$B = \frac{f}{I \times L}$$
$$= \frac{0.078}{3.2 \times 0.042} = 0.5803$$
$$= 0.58$$

magnetic flux density = ..... 0.58 .....



**ResultsPlus**  
Examiner Comments

This answer gains both marks, showing the rearrangement of the equation with a correct substitution for the first mark. The second mark is then awarded for the evaluation of  $B$ , the magnetic flux density.



**ResultsPlus**  
Examiner Tip

Remember the symbol for magnetic flux density is  $B$ .

### Question 4 (a)

This calculation shows an athlete training with a push sled. Candidates are asked to calculate the distance travelled by the sled when the work done on the sled is 7440J when a force of 645N is used to push it. It should also be noted that the answer is required to be given to the appropriate number of significant figures. As each of the values given in the equation are given to three significant figures then three significant figures should be given in the answer line.

This response shows the calculation and evaluation with the appropriate number of significant figures.

$$E = F \times d$$

$$\frac{E}{F} = d$$

$$\frac{7440}{645} = d$$

$$11.534883... = d$$

distance moved = .....11.5.....



3 marks are awarded.

The equation:

Work done = Force x distance moved in the direction of the force is given in symbols. The equation is then rearranged, and the values substituted for the first mark. The distance is then evaluated to score the second mark. The third mark is awarded for the answer, given to three significant figures in the answer line.



Look at the values in the question to decide on the number of significant figures to be used for the answer on the answer line.

## Question 4 (b)(i)

Candidates found it difficult to score all four marks for the description of the experiment. A frequent error came from not reading the question properly. It is stated in the question that the description should include the devices used to make the measurements. Therefore 'measure the length of the string' or 'measure the mass' did not score the first or second mark points, as the measuring devices were not included. The ruler could have usefully been added to the diagram. As well as the two necessary measurements of mass and height some detail of how to improve the accuracy of measurements and the equation to calculate gravitational potential energy should also be included.

The response gives a complete description of the experiment which scores full marks.

Gravitational Potential energy = mass x gravitational field strength x Change in vertical height.

- Measure change in vertical height using a meter rule. Measure the ~~whole~~ distance before the masses are lifted and where the masses are after lifted. Then do distance before lifted - distance after lifted to find change.
- Measure mass by weighing the total number of masses lifted on a balance.

\*The gravitational field strength we know is 9.8 N on earth  
Substitute these 3 numbers into the equation above to find gravitational potential energy. This is measured in Joules.



Four marks are scored.

A ruler is added to the diagram which scores the second marking point, a reference point is also labelled which scores the fifth marking point.

The candidate starts by giving the equation for gravitational potential energy, which scores the third marking point.

The change in vertical height is measured by measuring the distance with a ruler before and after the masses are lifted. This scores the fourth marking point and reinforces the second marking point.

The masses being measured using a balance scores the first marking point.



Read the question carefully to gain all the marks.

### Question 4 (b)(ii)

Many candidates were only able to score one mark for this calculation by giving the substitution and rearrangement of the gravitational energy equation. The second mark was not awarded for the calculation because the mass in grams in the question was not converted to kilograms for use in the equation.

This response shows a correct rearrangement and conversion of the mass unit.

$$\Delta GPE = m \times g \times \Delta h$$
$$\Delta h = \frac{\Delta GPE}{m \times g}$$
$$\Delta h = \frac{5.8}{320 \times 10} \quad \cancel{= \frac{5.8 \times 10^{-3}}{0.32 \times 10^{-3}}}$$
$$= \frac{5.8}{0.32 \times 10} = 1.8125$$

height = ..... 1.8125 .....



2 marks are scored.

The working is shown, and the candidate has completed one stage at a time. The correct equation is selected, the equation is rearranged to find to find the vertical height the masses travelled through, the mass in grams is then converted to kilograms to evaluate the change in height.



Work through a calculation showing one step at a time.

### **Question 4 (b)(iii)**

About half of the candidates were able to score this mark either by referring to friction in the motor, as it was only 59% efficient or by reference to heating and thermal energy being transferred or dissipated to the surroundings.

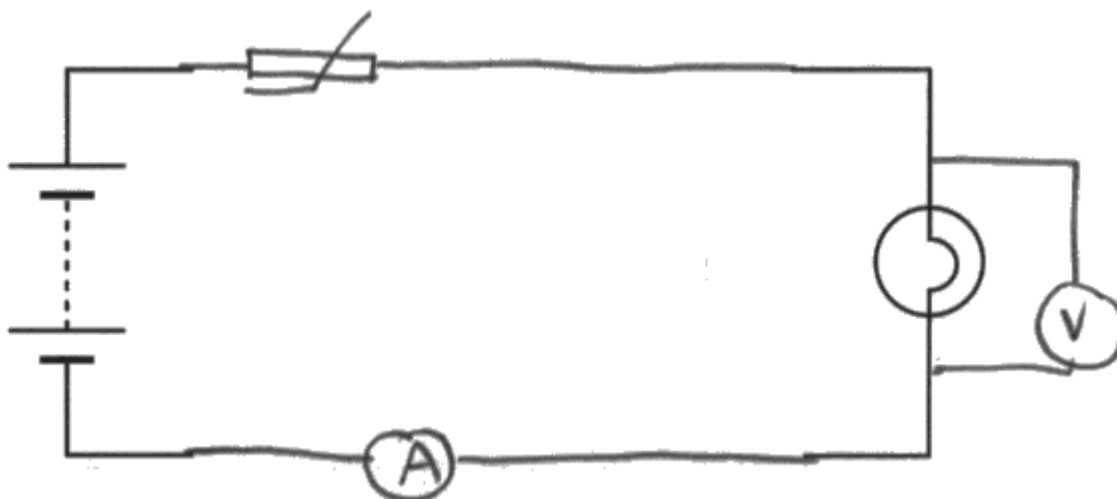
## Question 5 (a)

The completion of the circuit diagram to investigate how current varies, with potential difference for a filament lamp was only done correctly by a few candidates.

The symbols shown in the diagram were for a battery and a filament lamp. Some candidates did not recognise the symbol for the filament lamp and added their own indicator lamp, which was acceptable.

The symbol for the variable resistor was also confused with the symbol for a thermistor and although the variable resistor and ammeter were often placed in series in the circuit the voltmeter was not often placed in parallel with the lamp.

The circuit shows the symbol as a thermistor not a variable resistor.



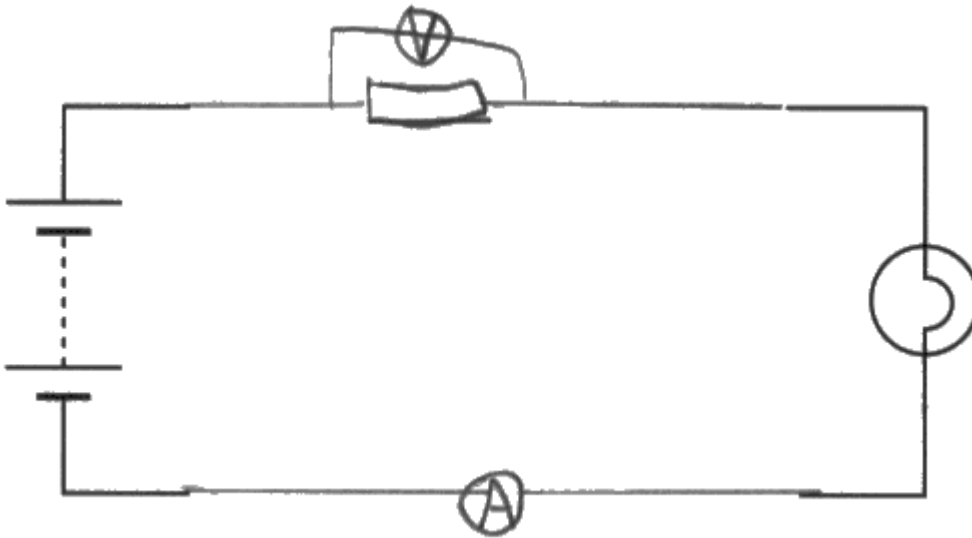
2 marks scored.

The ammeter and voltmeter are correctly positioned to score two marks, but the wrong symbol is used for the variable resistor.



Know your circuit symbols.

This response has the voltmeter in the wrong place.



**ResultsPlus**  
Examiner Comments

1 mark scored.

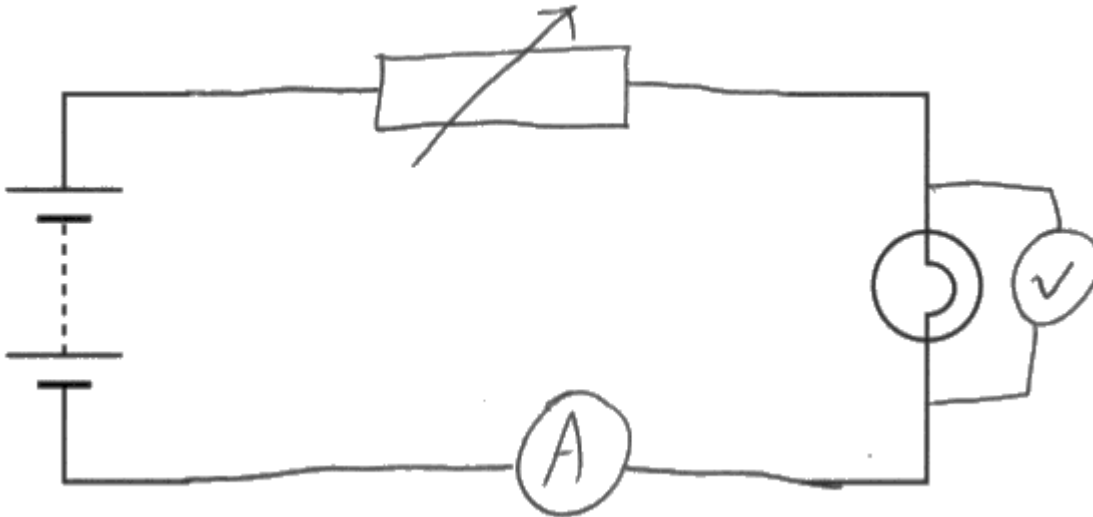
The resistor shown is a fixed resistor not a variable resistor. The voltmeter is shown in parallel but is across the resistor not the lamp.



**ResultsPlus**  
Examiner Tip

Practice drawing the circuits that you set up.

The response shows the correct circuit.



**ResultsPlus**  
Examiner Comments

This circuit diagram score 2 marks.

All the symbols are correct, the ammeter is in series and the voltmeter is in parallel with the lamp.



**ResultsPlus**  
Examiner Tip

Remember voltmeters are placed in parallel to measure the potential difference across a device.

### **Question 5 (b)(i)**

The use of a data logger to carry out the experiment is compared with a candidate taking repeat readings. The data logger takes 555 readings in two minutes. The candidates were asked to suggest one advantage of using the data logger. The correct suggestions included that it is quicker and more reliable. The most common error was to suggest that the data logger was more accurate or more precise.

## Question 5 (b)(ii)

The majority of candidates were able to describe the fact that on the graph the current increases as the potential difference increases, and this scores a mark. Some further detail to describe the relationship between potential difference and current was found to be more difficult as candidates needed to note non-linearity or changes in gradient. Stating that the graph showed a positive correlation did not score a mark.

This is a description of the graph, and it scores both marks.

> as potential difference increases, current increases  
> non-linear  
> decreasing gradient.



2 marks are scored

The first mark is for the 'as the potential difference increases, current increases'. The second mark is for 'non-linear' or 'decreasing gradient'.



Learn to give detail of the shape of the graph.

### Question 5 (b)(iii)

Candidates found it difficult to score both marks for this question. The question requires the candidates to use the graph of current against potential difference for the filament lamp to show how the resistance of the lamp changes with the potential difference. The first mark could be gained by knowing the resistance of a filament lamp increases as the potential difference increases. However, to gain the second mark the change in gradient of the graph had to be considered because using  $R = V/I$  at two points on the graph, it can be shown that the resistance of the lamp is increasing.

This response shows the candidate has calculated the resistance at two points on the graph.

As the potential difference increases, so does the resistance. At 0.5V, the resistance is 1.6  $\Omega$ , at 1V the resistance is 2.1239...  $\Omega$ . This shows that resistance increases with voltage.



2 marks scored.

The first mark is scored for 'as the potential difference increases so does the resistance'. The second mark is scored for showing numerically that the resistance has increased.



Learn to find the resistance from the slope of a graph showing current plotted against time.

### Question 5 (d)

Many candidates were unable to give the meaning of a potential difference as the energy transferred per unit charge and therefore could not score the second mark of giving the alternative unit to volts which is joules per coulomb J/C.

This example gives the correct response.

Using  $E = Q \times V$   
Rearranges to  $V = E \div Q$

~~Unit of potential~~

Unit of potential difference = unit of energy  $\div$  unit of charge  
= J/C



2 marks scored.

The equation  $E = Q \times V$  may be recalled and then rearranged to provide an equation showing  $V = E/Q$ . The unit of energy  $E$  is the joule, and the unit of charge  $Q$  is the coulomb. The equivalent unit of potential difference  $V$  is therefore joules per coulomb J/C.



Learn the meaning of potential difference.

## Question 6 (c)(i)

In this question an electric heater was used to supply energy to a brick in a storage heater. The specific heat capacity of the brick was given, and the temperature rise of the brick was to be found. Candidates needed to select the equation to determine specific heat capacity. The equation then had to be rearranged to calculate temperature rise.

This example shows a correct calculation.

change in thermal energy = mass  $\times$  specific heat capacity <sup>(2)</sup>  $\times$  temperature

$$\frac{210,000}{5.8 \times 860} = 42.1010425$$

temperature increase = 42.1 °C



**ResultsPlus**  
Examiner Comments

2 marks are scored.

The equation is given, and the values are substituted in the rearrangement for the first mark. The evaluation of 42 degrees C is seen for the second mark to be awarded.



**ResultsPlus**  
Examiner Tip

Use the equation booklet to select the correct equation.

## Question 6 (c)(ii)

It was stated in the question that the actual temperature increase will be smaller than the temperature increase that has been calculated in 6ci. Candidates were asked to explain the reason for this, which could either be because not all the energy produced is supplied to the brick or as the brick is heated energy is transferred from the brick. It then needs to be explained that this energy will be transferred to other parts of the storage heater or to the surroundings. The explanation could also be linked to the equation used as this shows less heat energy supplies will give a lower temperature rise if the mass and specific heat capacity are kept the same.

A response giving a correct explanation.

Some energy will have been lost to the surroundings and not all thermal energy will go to the brick.



2 marks awarded.

'Some energy will have been lost to the surroundings' is the third marking point.

'not all the energy will go into the brick' is the first marking point.



Make the link to less heat energy makes a smaller rise in temperature.

## Question 6 (d)

This question required the description of an investigation to determine the value of the specific heat capacity for water. Candidates were told to include the apparatus needed in the experimental procedure and how the value for the specific heat capacity could be calculated from the measurements taken.

A large space was left for a diagram. A labelled diagram showing the apparatus used and giving the equation for specific heat capacity was sufficient to achieve level 1.

A labelled diagram and the measurement of an initial and final temperature with a thermometer was sufficient to achieve level 2. It was possible to achieve level 2 with the use of a bunsen burner for heating as only a diagram and the two temperature measurements were needed and the use of a bunsen burner means that the energy supply cannot be quantified.

To achieve Level 3 a labelled diagram was most helpful as it could show the electrical heating using a circuit with a Joulemeter between the powerpack and the heater or a circuit with a power pack, ammeter, voltmeter and a heater. The energy supplied by the power pack in the circuit with the ammeter and voltmeter was given by the equation  $E = I \times V \times t$  so the time for which the heater was switched on would also have to be measured. The level 3 also had to include the measurement of the temperature rise.

Example of a level 1 response.

- Change in thermal energy = mass  $\times$  specific heat capacity  $\times$  change in temperature
- Apparatus needed: thermometer, beaker of water, mass balance,
- Independent variable = temperature, mass
- Dependent variable = specific heat capacity
- Control variable = ~~the~~ volume of water



Level 1 2 marks.

The first line gives the equation to be used.

There is no labelled diagram but lines 2 and 3 give the apparatus as, thermometer, beaker and mass balance.

The remaining lines do not contain any credit worthy material.

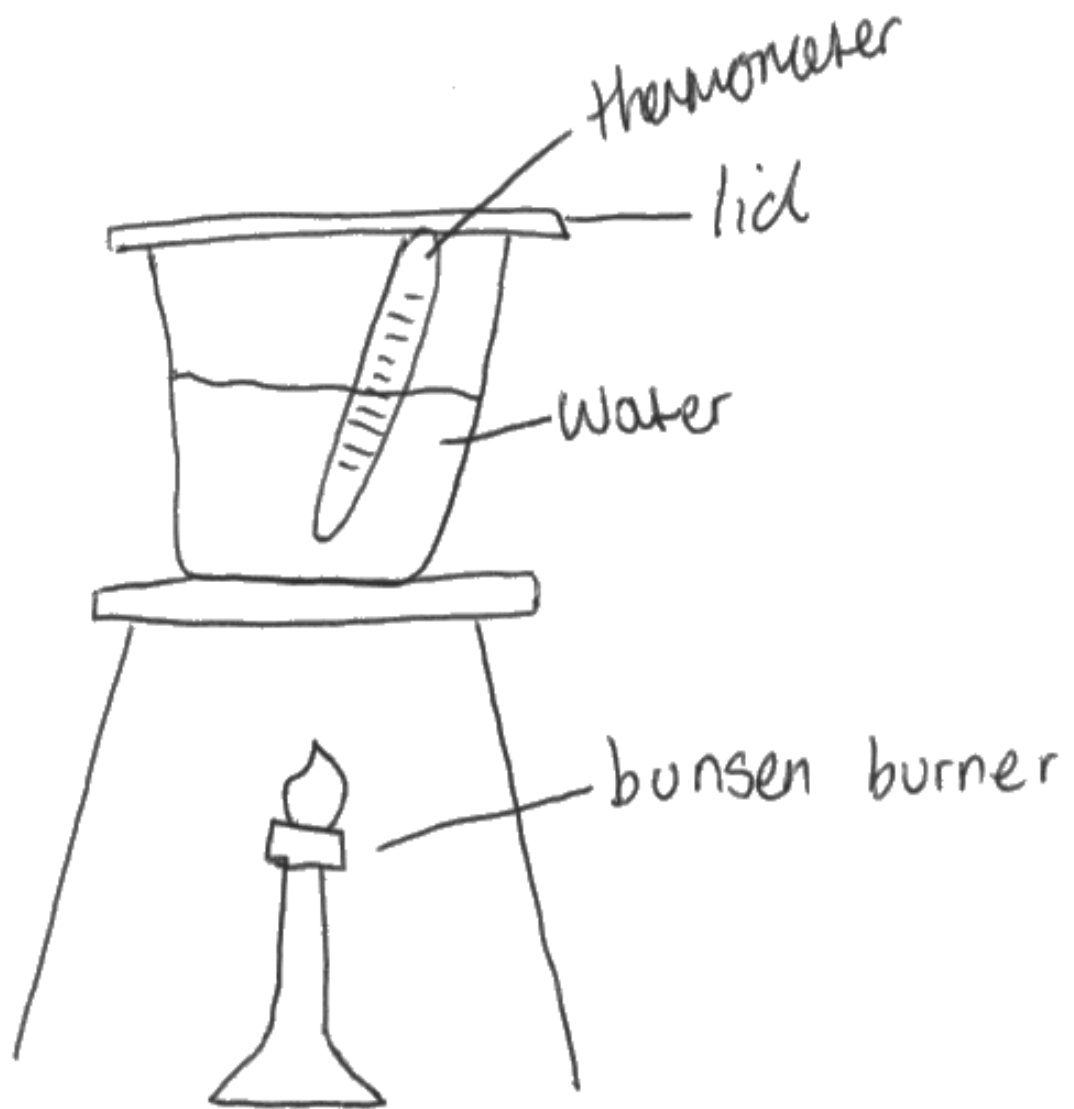


Always draw a diagram. It will help you to focus on an accurate description.

Example of a Level 2 response.

$$\Delta Q = m \times c \times \Delta \theta$$

$$\frac{\Delta Q}{m} / \Delta \theta = c$$



Firstly you find out the mass of the water by weighing it.

Then you place the container of water over a bunsen burner and before you turn it on you measure the temperature of the water using a thermometer. Then you turn the bunsen burner on at a controlled heat so you can measure the change in temperature. (possibly  $99^{\circ}\text{C}$  so it doesn't boil). After a controlled amount of time you measure the new temperature using a thermometer. Once you have all of the numbers you can use the equation

$$\Delta Q = m \times c \times \Delta \theta$$

but ~~water~~ will need to rearrange to make  $c$  the subject.



Level2 4 marks.

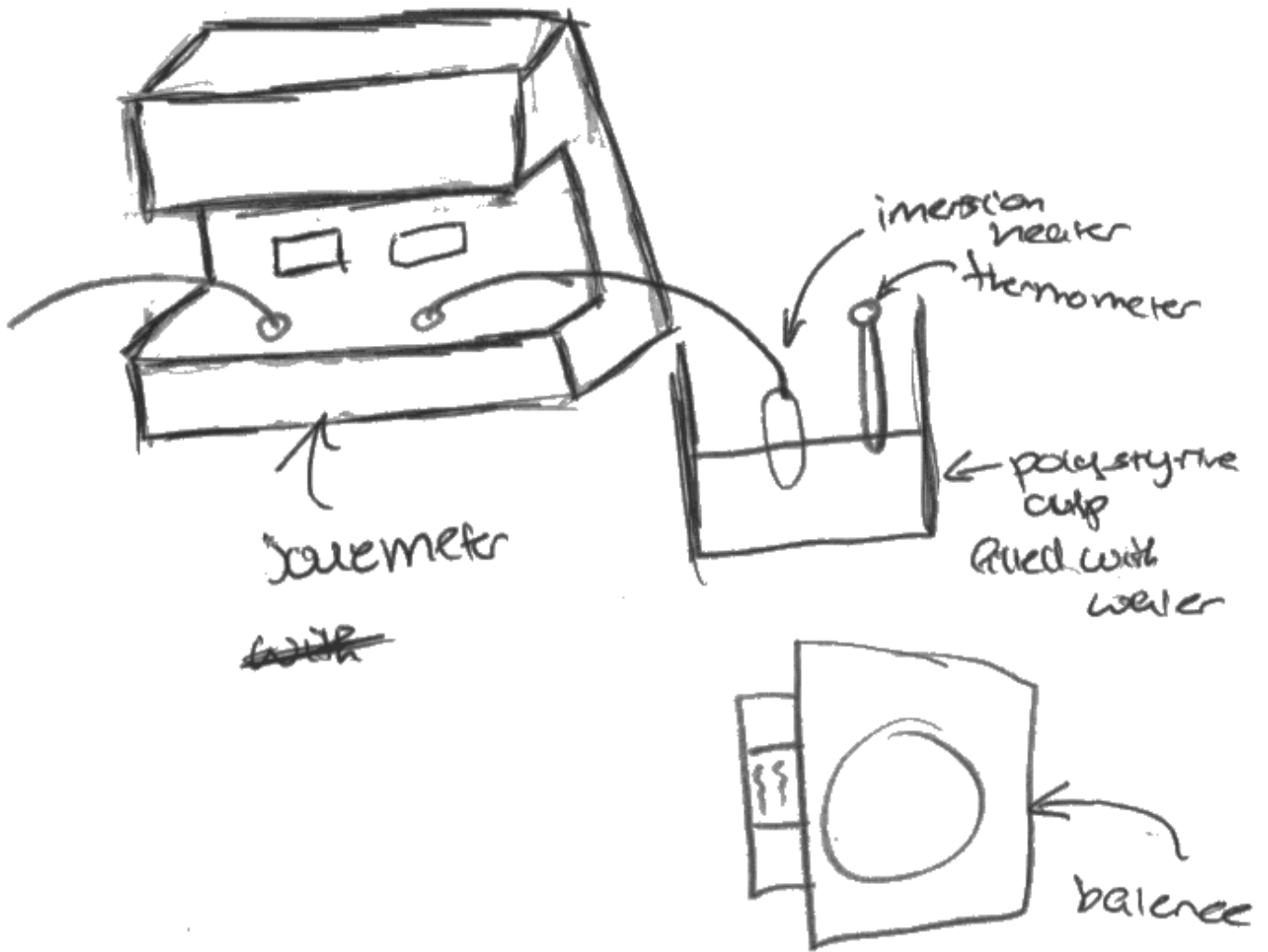
The diagram shows water being heated by a Bunsen burner so the correct investigation is probably not being described. However, two relevant pieces of apparatus are included as is the correct equation. The description includes measuring the initial temperature with a thermometer of water, heating the water and 'measuring the new temperature after a controlled amount of time'

This is sufficient for level2



Use the equation to work out what measurements need to be taken.

Example of a Level3 response



$$\text{Specific heat capacity} = \frac{\text{change in thermal energy}}{\text{Mass} \times \text{change in temperature}}$$

you need to measure the mass by <sup>putting beaker</sup> ~~measuring the~~ <sup>balance</sup> on ~~balance~~  
then zero it. then add your water and take the measurement of the mass. measure the starting temperature using a thermometer and the change in thermal energy using a joulemeter. cover water with a lid and make sure cup is insulated to reduce ~~to~~ heat loss to surroundings.

after heating take new temperature ~~of~~ using thermometer and the new thermal energy ~~in~~ using a joule meter. plug values into equation as seen at the top to calculate specific heat capacity.

you can repeat this 2 times to find an average specific ~~latent~~ heat capacity (Total for Question 6 = 12 marks)



Level 3 6 marks.

The labelled diagram shows all the apparatus needed for the experiment.

The text starts off by giving the equation text.

The mass of the water is measured using a balance.

The initial temperature is measured using a thermometer and a joulemeter measures the thermal energy.

There is a precaution to add a lid and insulation to the beaker.

After heating to the new temperature and the new thermal energy readings are taken.

The values are then used in the equation to calculate a value for the specific heat capacity.



Keep descriptions concise and accurate.

## Paper Summary

Based on their performance on this paper, candidates should:

- know the shape and direction of the Earth's magnetic field
- practice the use of standard form
- note when conversion of units is needed and then learn how to convert units
- know circuit symbols
- know how to find the right number of significant figures
- use the information given in diagrams and a table to help with your answers
- practice writing accurate, concise descriptions and explanations.

## **Grade boundaries**

Grade boundaries for this, and all other papers, can be found on the website on this link:

<https://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html>

