

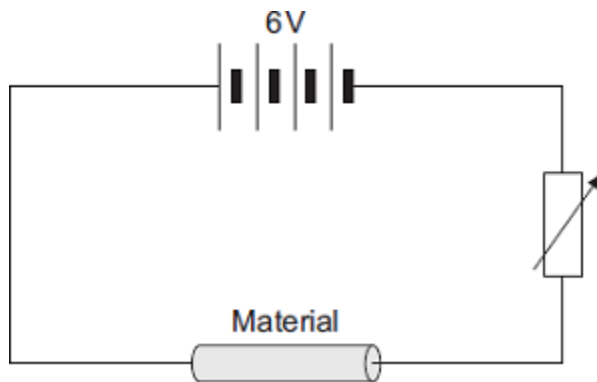
Name of the Student: _____

Max. Marks : 21 Marks

Time : 21 Minutes

Q1.

- (a) The diagram shows the circuit used to investigate the resistance of a sample of a material. The diagram is not complete; the ammeter and voltmeter are missing.



- (i) Draw the symbols for the ammeter and voltmeter on the diagram in the correct places.

(2)

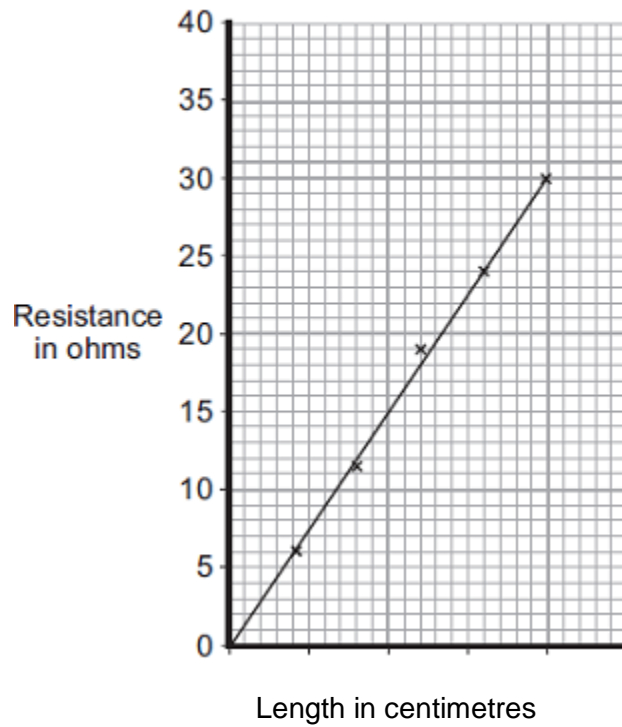
- (ii) How can the current through the material be changed?

(1)

- (b) The material, called conducting putty, is rolled into cylinders of different lengths but with equal thickness.

Graph 1 shows how the resistance changes with length.

Graph 1



- (i) The current through a 25 cm length of conducting putty was 0.15 A.

Use **Graph 1** to find the resistance of a 25 cm length of conducting putty.

Resistance = _____ ohms

(1)

- (ii) Use your answer to **(b) (i)** to calculate the potential difference across a 25 cm length of conducting putty.

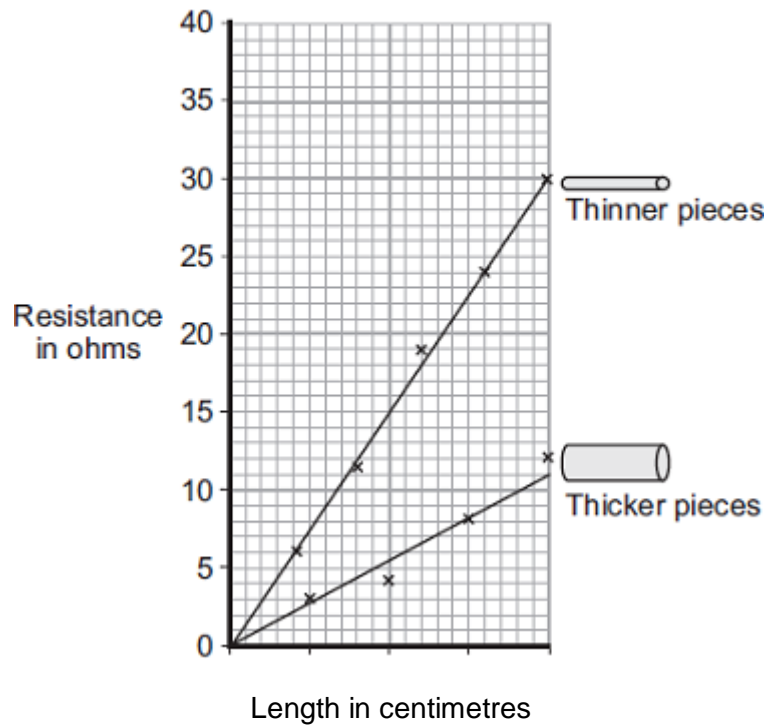
Show clearly how you work out your answer.

Potential difference = _____ volts

(2)

- (c) A second set of data was obtained using thicker pieces of conducting putty. Both sets of results are shown in **Graph 2**.

Graph 2



- (i) What is the relationship between the resistance and the thickness of the conducting putty?

(1)

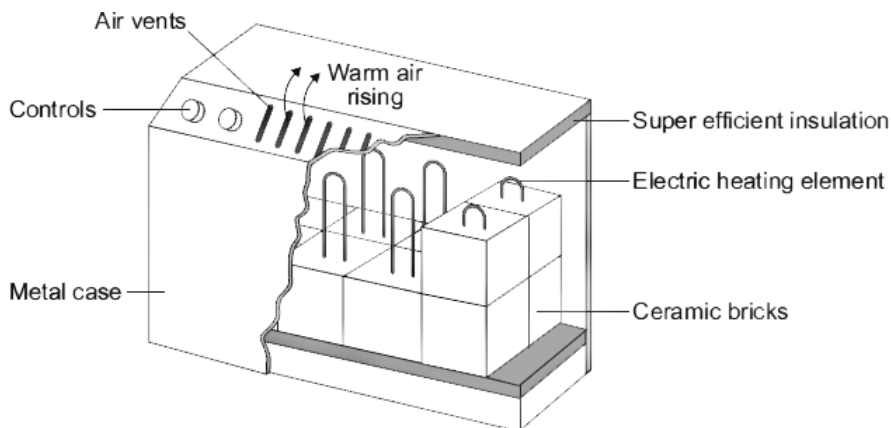
- (ii) Name **one** error that may have reduced the accuracy of the results.

(1)

(Total 8 marks)

Q2.

The diagram shows how one type of electric storage heater is constructed. The heater has ceramic bricks inside. The electric elements heat the ceramic bricks during the night. Later, during the daytime, the ceramic bricks transfer the stored energy to the room.



- (a) (i) Complete the following sentences using words from the box.

conduction	convection	evaporation
-------------------	-------------------	--------------------

Energy is transferred through the metal casing by _____

The warm air rising from the heater transfers energy to the room by _____

(2)

- (ii) The inside of the metal case is insulated.

Which **one** of the following gives the reason why?

Tick (✓) **one** box.

To transfer energy from the ceramic bricks to the room faster

To stop energy from the room transferring into the heater

To keep the ceramic bricks hot for a longer time

(1)

- (b) In winter, the electricity supply to a 2.6 kW storage heater is switched on for seven hours each day.

- (i) Calculate the energy transferred, in kilowatt-hours, from the electricity supply to the heater in seven hours.

Show clearly how you work out your answer.

Energy transferred = _____ kWh

(2)

- (ii) The electricity supply to the heater is always switched on between midnight and 7 am. Between these hours, electricity costs 5 p per kilowatt-hour.

Calculate how much it costs to have the heater switched on between midnight and 7 am.

Cost = _____ p

(1)

- (c) Between 7 am and 8 am, after the electricity supply is switched off, the temperature of the

ceramic bricks falls by 25 °C.

Calculate the energy transferred from the ceramic bricks between 7 am and 8 am.

Total mass of ceramic bricks = 120 kg.

Specific heat capacity of the ceramic bricks = 750 J/kg °C.

Show clearly how you work out your answer.

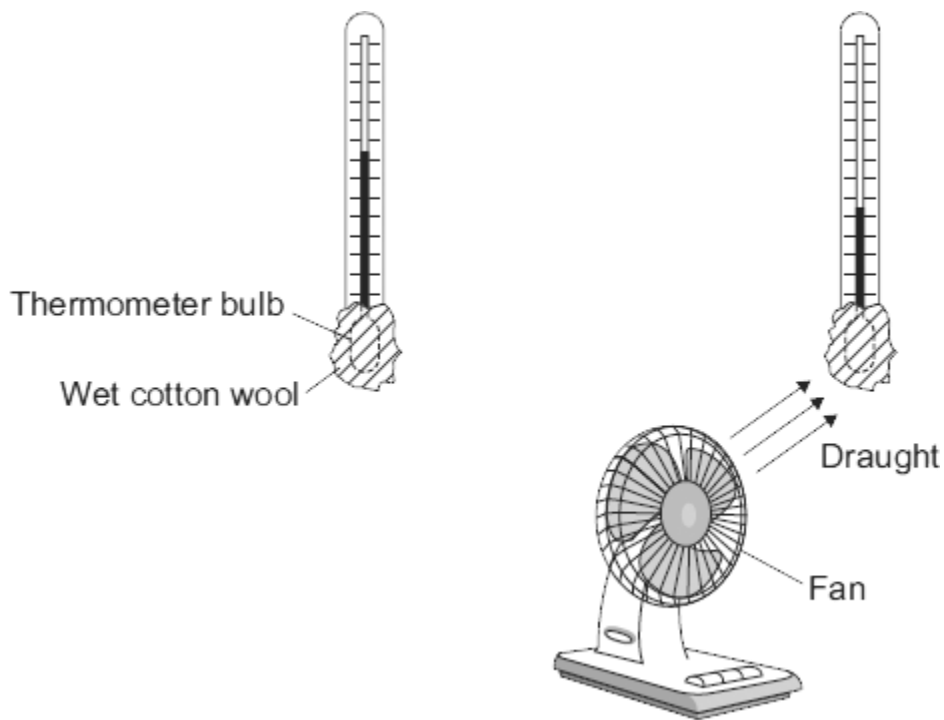
Energy transferred = _____ J

(2)

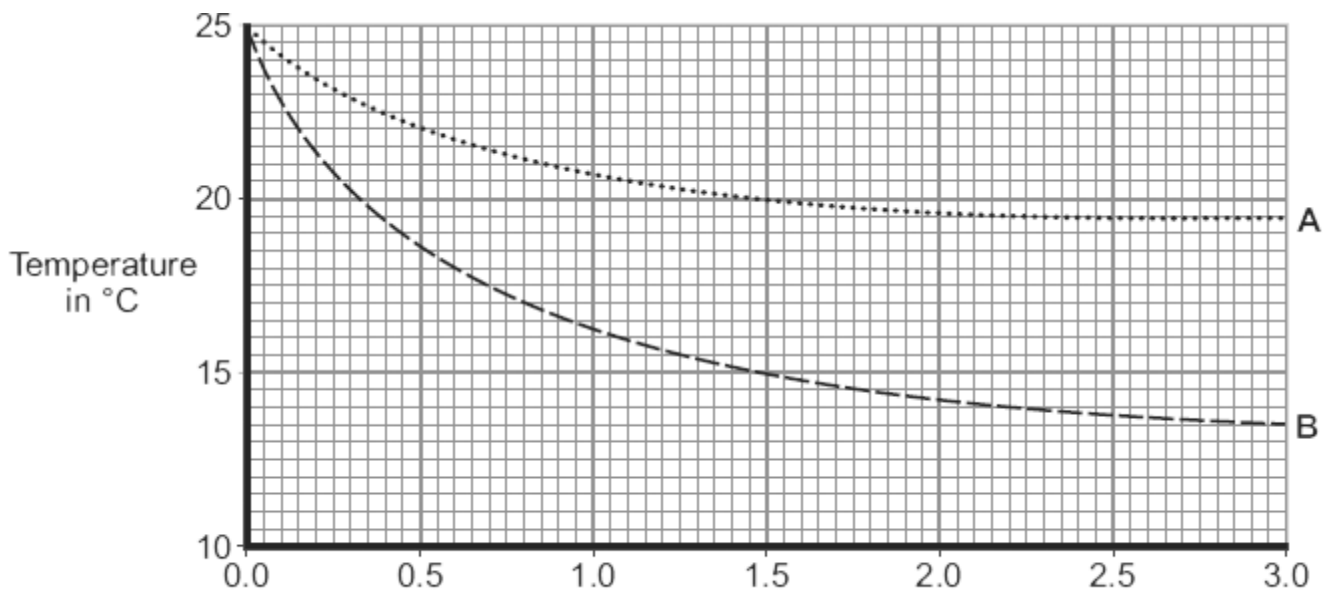
(Total 8 marks)

Q3.

The diagram shows two thermometers. The bulb of each thermometer is covered with a piece of wet cotton wool. One of the thermometers is placed in the draught from a fan.



The graph shows how the temperature of each thermometer changes with time.



- (a) Which of the graph lines, **A** or **B**, shows the temperature of the thermometer placed in the draught?

Write the correct answer in the box.

Explain, in terms of evaporation, the reason for your answer.

(3)

- (b) A wet towel spread out and hung outside on a day without wind dries faster than an identical wet towel left rolled up in a plastic bag.

Explain why.

(2)

(Total 5 marks)