Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: Electricity (Standard demand)

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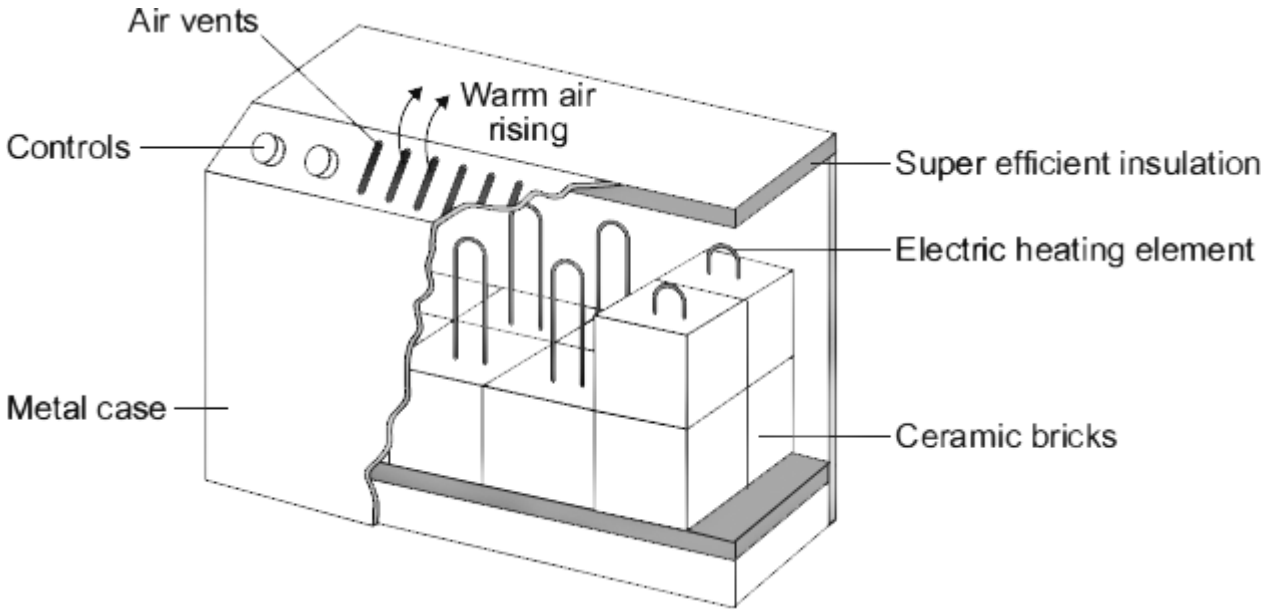
Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

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) In winter, the electricity supply to a 2.6 kW storage heater is switched on each day between midnight and 7 am. Between these hours, electricity costs 5 p per kilowatt-hour.

Calculate the daily cost of using the storage heater.

Show clearly how you work out your answer.

_____

_____

_____

_____

_____

Cost = _____ p

(3)

(b) Homes with electric storage heaters have a separate meter to measure the electricity supplied between midnight and 7 am. Another meter measures the electricity supplied at other times. This electricity supplied at other times costs 15 p per kilowatt-hour.

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Electricity companies encourage people to use electricity between midnight and 7 am by selling the electricity at a lower cost.

Suggest why.

_____

_____

(1)

(c) By 7 am, the temperature at the centre of the ceramic bricks is about 800 °C.
The temperature of the outside metal casing is about 80 °C.

The ceramic bricks are surrounded by 'super-efficient' insulation.

Explain why.

_____

_____

_____

_____

(2)

(d) At 7 am, the electricity supply switches off and the temperature of the ceramic bricks starts to fall. The temperature of the bricks falls by 100 °C over the next four hours. During this time, 9 000 000 J of energy are transferred from the bricks.

Calculate the total mass of ceramic bricks inside the heater.

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

Show clearly how you work out your answer.

_____

_____

_____

_____

Mass = _____ kg

(2)

(Total 8 marks)

Q2.

The data included in the diagrams gives the power of the electrical appliances.

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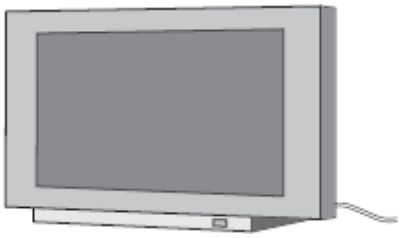
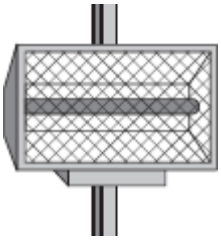
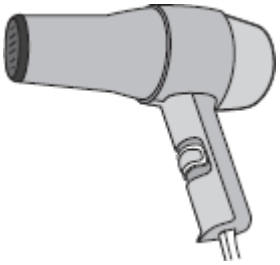


TV
160 W

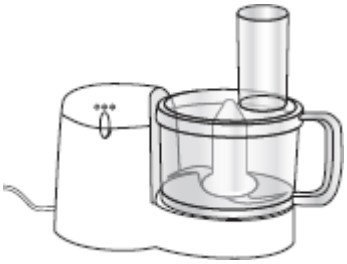


Radiant heater
1.0 kW



Hairdryer
1100 W

Sandwich toaster
1.1 kW



Food processor
0.4 kW

Table lamp
40 W

(a) (i) Which of the appliances are designed to transform electrical energy to kinetic energy?

_____

_____

(1)

(ii) Which of the appliances waste energy as heat?

_____

_____

(1)

(b) Leaving the radiant heater switched on is likely to lead to more carbon dioxide being emitted into the atmosphere than leaving the table lamp on for the same length of time.

Explain why.

_____

_____

_____

_____

(2)

(c) A homeowner decides to monitor the amount of electrical energy used in his home. He can do this by using the home's electricity meter or by using a separate electronic device.

The table gives some information about each method.

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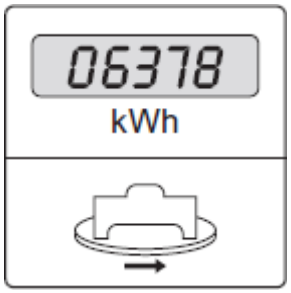
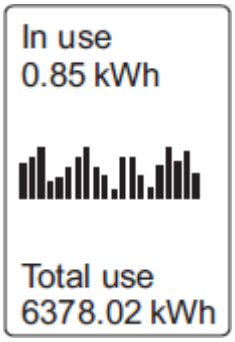
Electricity meter	Electronic device
Records to the nearest kilowatt-hour	Records to the nearest 1/100th kilowatt-hour
Homeowner takes readings at regular intervals	Energy use recorded continuously and stored for one year
	Displays a graph showing energy use over a period of time
	

(i) Complete the following sentence.

The reading given by the electronic device is more _____ than the reading given by the electricity meter.

(1)

(ii) Suggest how data collected and displayed by the electronic device could be useful to the homeowner.

_____

_____

_____

_____

_____

_____

(3)

(Total 8 marks)

Q3.

The diagram shows the circuit set up by a student.

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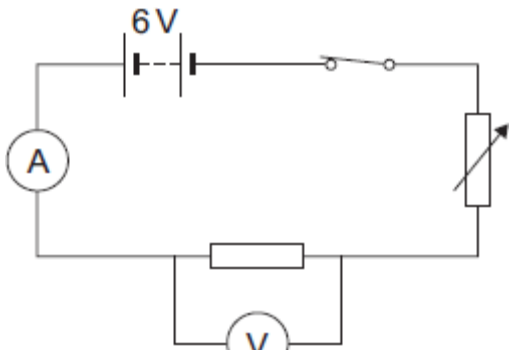


(a) The student uses the circuit to test the following hypothesis:

'The current through a resistor is directly proportional to the potential difference across the resistor.'

(i) If the hypothesis is correct, what should the student predict will happen to the current through the resistor when the potential difference across the resistor is doubled?

_____

_____

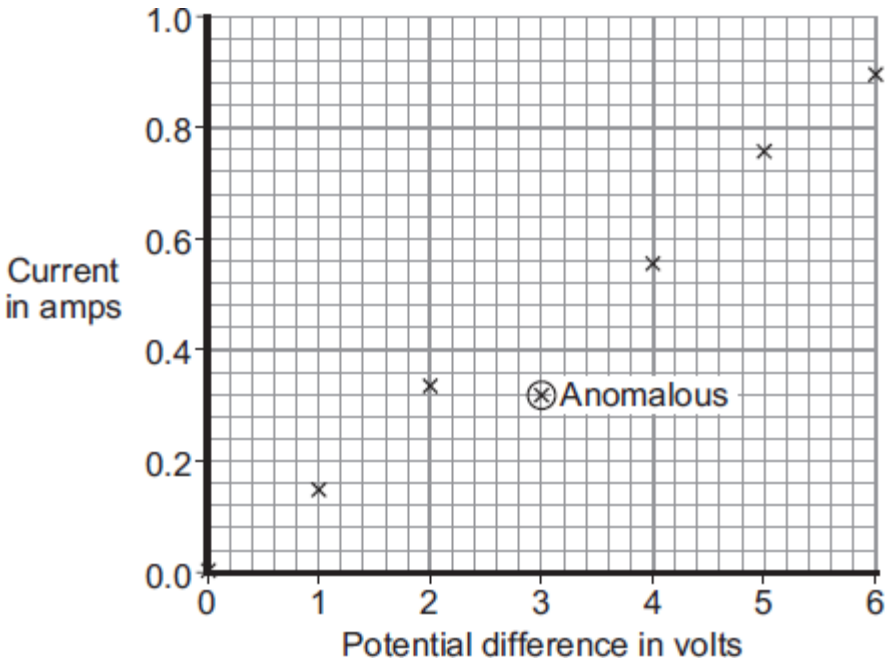
(1)

(ii) Name the component in the circuit used to change the potential difference across the resistor.

_____

(1)

(b) The student used the data obtained to plot the points for a graph of current against potential difference.



(i) Why has the student plotted the points for a line graph and not drawn a bar chart?

_____

_____

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(1)

(ii) One of the points has been identified by the student as being anomalous.

What is the most likely cause for this anomalous point?

_____

_____

(1)

(iii) Draw a line of best fit for these points.

(1)

(iv) Does the data the student obtained support the hypothesis?

Give a reason for your answer.

_____

_____

(1)
(Total 6 marks)

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