

**Name of the Student:** \_\_\_\_\_

**Max. Marks : 18 Marks**

**Time : 18 Minutes**

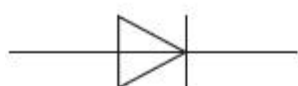
Q1.

The graphs show how the current in a component changes with the voltage applied across the component.

Draw a line from each component to its correct graph.

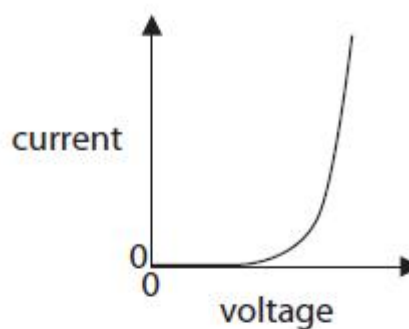
(2)

**component**

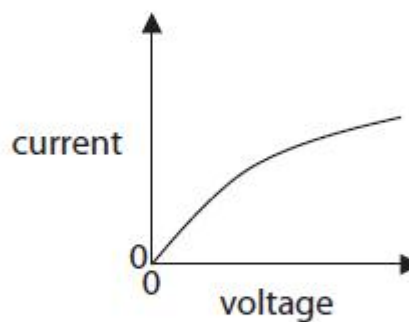


diode

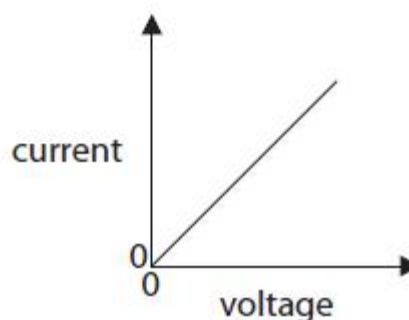
**graph**



resistor



lamp



Q2.

A torch has a battery and a bulb.

The current in its circuit is 0.08 A.

Calculate the amount of charge passing a point in this circuit in 2 minutes.

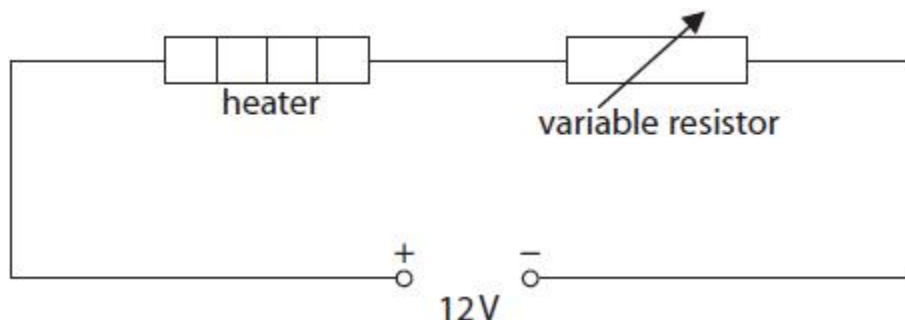
(3)

charge = ..... coulombs

Q3.

A technician investigates the potential difference (voltage) across an electrical heater.

This circuit diagram shows the circuit the technician uses.



(i) Add a voltmeter to the circuit which will measure the potential difference (voltage) across the heater.

(2)

(ii) The resistance of the heater is  $15\ \Omega$ .

The current in the heater is  $0.56\ \text{A}$ .

Calculate the potential difference (voltage) across the heater.

(2)

potential difference = ..... V

(iii) The technician changes the value of the variable resistor.

She measures the new voltage across the heater and the new current in it.

Here are her results:

voltage =  $6.0\ \text{V}$

current =  $0.40\ \text{A}$ .

Calculate the amount of electrical energy transferred in  $30\ \text{s}$  by the heater.

(2)

energy transferred = ..... J

(iv) The total energy supplied by the battery in  $30\ \text{s}$  is  $144\ \text{J}$ .

Explain why your answer in (iii) is not the same as the total energy supplied by the battery.

(2)

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.....  
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Q4.

Figure 20 shows some of the apparatus that students use to determine the resistance of a piece of iron wire.

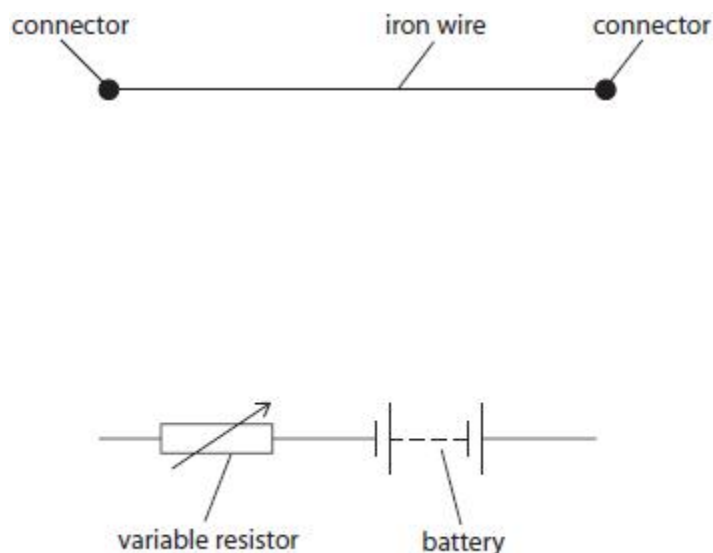


Figure 20

Connecting wires, a voltmeter and an ammeter are added.

The students extend the investigation to determine how the resistance of the iron wire changes with its length.

(i) Give the name of **one** additional piece of apparatus the students would need.

(1)

(ii) Figure 21 shows a graph of the results.

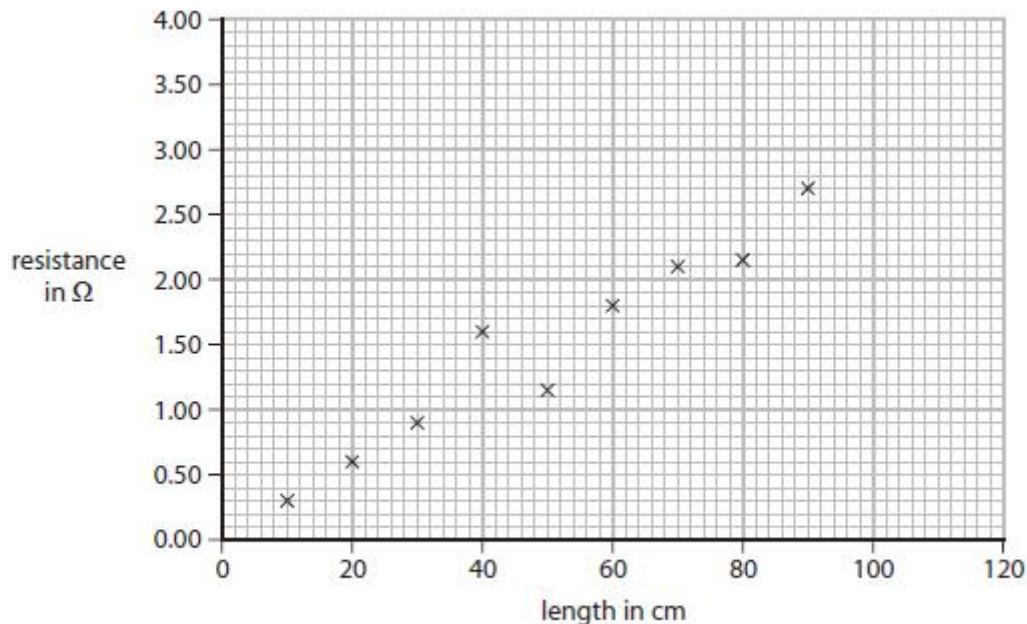


Figure 21

Draw a straight line of best fit on Figure 21.

(1)

(iii) Use Figure 21 to estimate the resistance of a 100 cm length of the iron wire.

(1)

resistance = .....  $\Omega$

(iv) The variable resistor shown in Figure 20 is used to prevent the iron wire from becoming too hot.

Explain how the variable resistor is used to prevent the iron wire from becoming too hot.

(2)

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**(Total for question = 5 marks)**