

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Q1.

Some students investigate resistors in parallel.

The students set up a circuit containing **four** identical resistors.

The circuit used is shown in Figure 21.

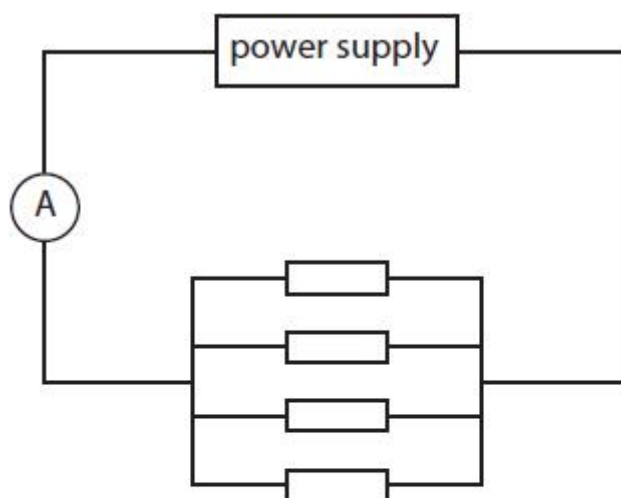


Figure 21

The students measure the current from the power supply and the voltage (p.d.) across the resistors.

(i) On Figure 21, draw a voltmeter connected to measure the voltage (p.d.) across the resistors.

(1)

The students remove one resistor and measure the current and voltage again with only 3 resistors in the circuit.

They repeat the measurements of current and voltage with only 2 resistors in the circuit and then with only 1 resistor in the circuit.

Figure 22 is a table of their results.

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

Figure 22

(ii) Using data from the table in Figure 22, predict the current from the power supply when there are 4 resistors in the circuit.

(1)

current = mA

(iii) Using data from the table in Figure 22, calculate the resistance of **only 1** resistor.

(3)

resistance = Ω

(iv) Using data from the table in Figure 22, explain what happens to the **total resistance of the circuit** as the number of resistors in parallel decreases.

(3)

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(Total for question = 8 marks)

Q2.

This question is about using the mains electricity supply.

- (i) An electric kettle is used to boil some water.
The mains supply voltage is 230 V.
The power supplied to the kettle is 1.9 kW.

Calculate the current in the kettle.

Use the equation

$$I = \frac{P}{V}$$

(2)

current supplied to the kettle = A

- (ii) A coffee machine takes 120 s to heat some water.

Mains supply voltage = 230 V

Current in this coffee machine = 7.4 A

Calculate the energy transferred to the coffee machine in 120 s.

Use an equation selected from the list of equations at the end of the paper.

(2)

energy transferred to coffee machine = J

(Total for question = 4 marks)

Q3.

The circuit in Figure 1 is switched on.

A charge of 1.2 C leaves the battery in a time of 4.0 s.

Calculate the current in the circuit.

Use the equation

$$\text{current} = \frac{\text{charge}}{\text{time}}$$

current = A

(Total for question = 2 marks)

Q4.

An electric heater is connected to a 230 V supply.

The power supplied to the heater is 2.6 kW.

Calculate the current in the heater.

(3)

current = A

(Total for question = 3 marks)