

Name of the Student: _____

Max. Marks : 22 Marks

Time : 22 Minutes

Q1.

* Explain, with the aid of a circuit diagram, the method a student could use to investigate how the resistance of a single lamp changes with the potential difference across the lamp.

(6)

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(Total for question = 6 marks)

Q2.

A student investigates resistors connected in parallel using a number of resistors. Each resistor has the same resistance.

Figure 10 shows a circuit diagram with one resistor, R .

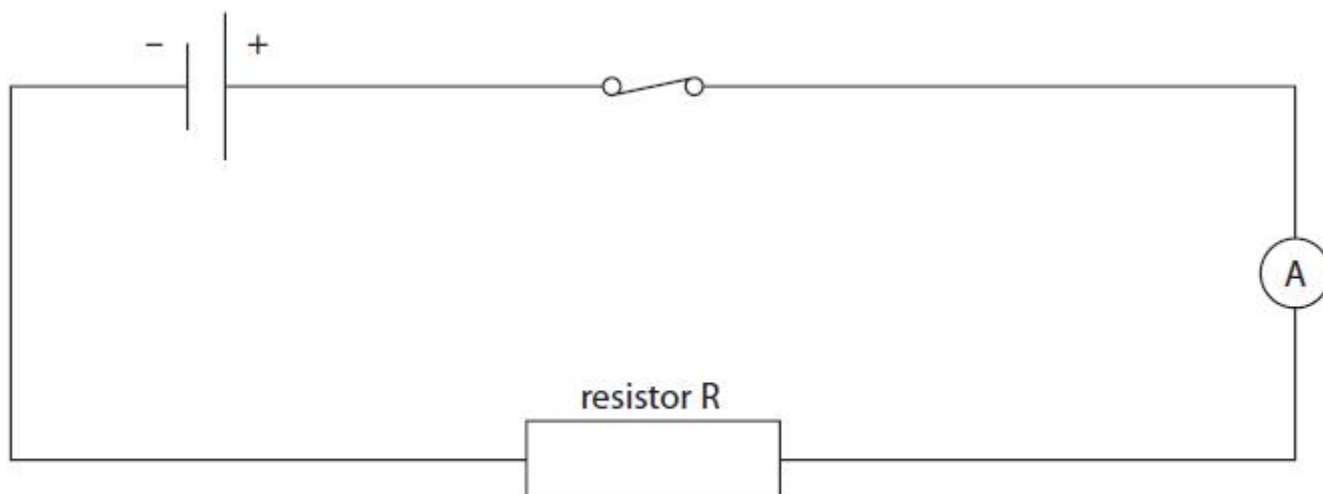


Figure 10

(i) Add to Figure 10:

- a voltmeter to find the potential difference across resistor R
- another resistor in parallel with resistor R .

(2)

(ii) State the measurements that the student must take to find the overall resistance of the resistors in parallel.

(2)

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(iii) The student investigates how the overall resistance of the circuit changes when additional resistors are added in parallel to R .

Each resistor has the same resistance.

Figure 11 shows the results of the student's investigation.

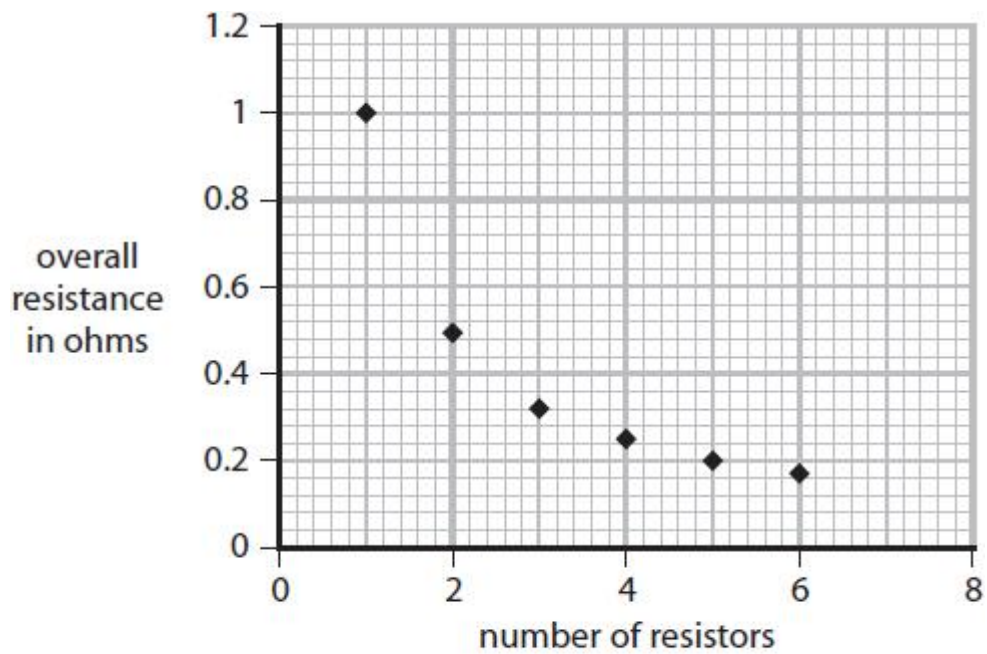


Figure 11

State the resistance of a single resistor.

(1)

resistance = Ω

- (iv) Comment on the relationship between the overall resistance of the circuit and the number of resistors in parallel.

Use information from Figure 11 to support your answer.

(3)

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(Total for question = 8 marks)

Q3.

Some students investigate resistors in parallel.

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

The circuit used is shown in Figure 2.

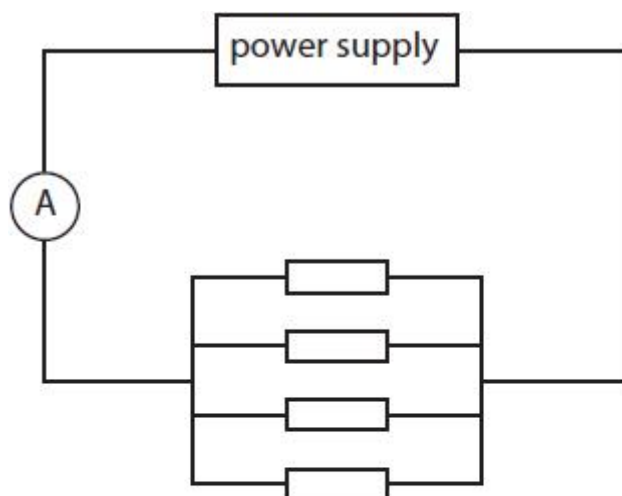


Figure 2

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

(i) On Figure 2, 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 3 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 3

(ii) Using data from the table in Figure 3, 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 3, calculate the resistance of **only 1** resistor.

(3)

resistance = Ω

(iv) Using data from the table in Figure 3, 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)