

Name of the Student: _____

Max. Marks : 22 Marks

Time : 22 Minutes

Q1.

A different circuit is then set up with two resistors as shown in Figure 12.



Figure 12

(i) Calculate the potential difference across the 15 Ω resistor.

(2)

potential difference = V

(ii) Calculate the total power dissipated when there is a current of 0.20 A in the two resistors.

Use the equation

$$P = I^2 \times R$$

(2)

power produced W

(Total for question = 4 marks)

Q2.

Figure 10 shows two electrical devices for heating water.

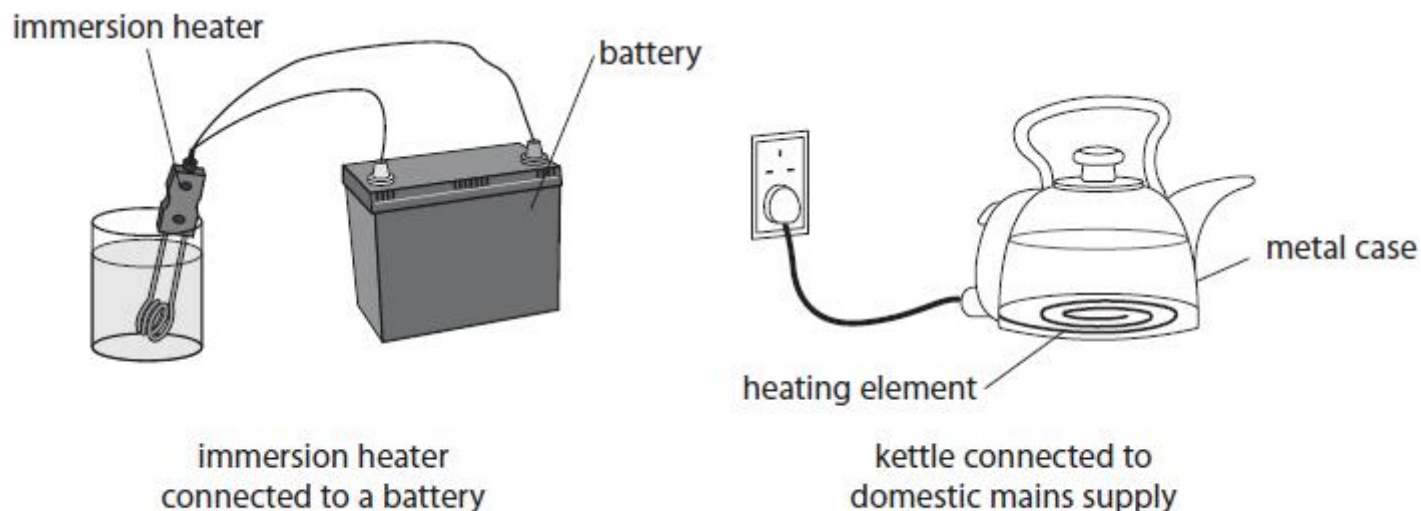


Figure 10

- (i) The current in the element of the immersion heater is 14 A.

The power of the immersion heater is 130 W.

Calculate the resistance of the immersion heater.

Give your answer to two significant figures.

(3)

resistance of immersion heater = Ω

- (ii) The current in the heating element of the kettle is 8.3 A.

State **two** differences between the movement of charge in the heating element of the kettle and the movement of charge in the immersion heater.

(2)

1

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2

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(Total for question = 5 marks)

Q3.

Figure 1 shows a lamp connected to a d.c. power supply.

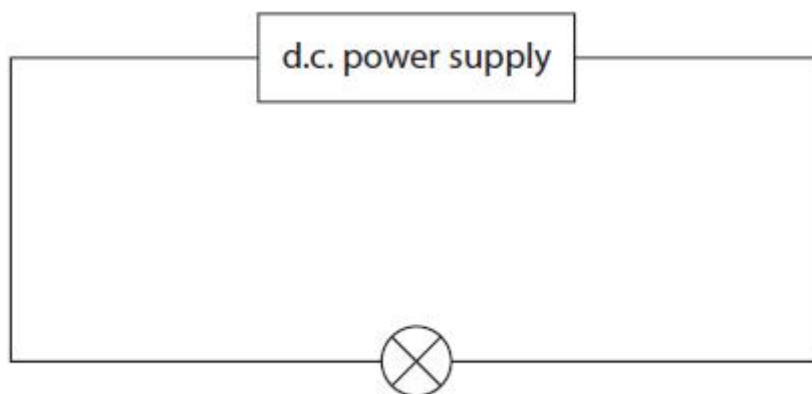


Figure 1

The power supply provides a potential difference (voltage) of 4.5 V.

The current in the lamp is 0.30 A.

(i) Calculate the resistance of the lamp.

Use the equation

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

(1)

resistance = Ω

(ii) Calculate the power supplied to the lamp.

(2)

power = W

(Total for question = 3 marks)

Q4.

The potential difference (voltage) across another piece of wire is 1.56 V.

The current in the wire is 0.45 A.

Calculate the resistance of this piece of wire.

Use the equation

$$V = I \times R$$

(2)

resistance = Ω

(Total for question = 2 marks)

Q5.

A student investigates how the current in a lamp changes with the potential difference across the lamp. The student uses the results to calculate the resistance of the lamp. The results are shown in the table in Figure 2.

potential difference in V	current in A	resistance in Ω
1.0	0.09	11
2.0	0.14	14
3.0	0.18	17
4.0	0.22	18
5.0	0.26	
6.0	0.30	20

Figure 2

- (i) One value of resistance is missing from the table in Figure 2.

Calculate the value of resistance that is missing from the table.

(3)

missing resistance = Ω

- (ii) The student writes this conclusion:

'The resistance of the lamp is directly proportional to the potential difference.'

Comment on the student's conclusion.

Use information from Figure 2 in your answer.

(3)

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- (iii) The student used a power supply that had fixed output voltage settings.

Each of these outputs was a whole number of volts.

Describe how the student could add a component to the circuit that would provide a continuously variable voltage across the lamp.

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(Total for question = 8 marks)