3.6 Current, Potential Difference, Resistance and Electrical Power: 10-minute Pack

EDEXCEL 4PH1 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 State the unit of potential difference used when measuring across a component in a circuit, and give its symbol.

(Total for Question 1 is 1 mark)

2 In the context of simple electric circuits, define electric current and name the charge carrier in a metal conductor.

(Total for Question 2 is 1 mark)

3 A fixed resistor in a circuit has a potential difference of 12 V across it and a current of 0.30 A through it. Calculate the resistance of the resistor using V = IR, showing the equation, substitution and final answer with unit.

(Total for Question 3 is 3 marks)

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4 At a junction in a parallel circuit three branch currents are measured: 0.20 A, 0.35 A and an unknown third branch current. If the total current leaving the battery is 0.80 A, determine the third branch current and state the rule used at the junction.

(Total for Question 4 is 2 marks)

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5 A filament lamp draws 0.50 A when 2.0 V is applied and 0.75 A when 6.0 V is applied. Determine the resistance of the filament at the lower voltage and at the higher voltage, showing equation, substitution and final answers with units, and explain briefly why the resistances are different.

(Total for Question 5 is 3 marks)

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Mark scheme · 3.6 Current, Potential Difference, Resistance and Electrical Power: 10-minute Pack

Question 1

volt, symbol V **B1**

Answer: Volt, symbol V

Question 2

electric current is the flow of electric charge (through a conductor) **B1**

Answer: The flow of electric charge; charge carriers in a metal are electrons

Question 3

writes V = I R or rearranges to R = V / I **M1**

substitutes R = 12 / 0.30 **M1**

R = 40 ohm cao **A1**

Answer: 40 ohm

Question 4

uses conservation: I_total = sum of branch currents and forms I_third = 0.80 - 0.20 - 0.35 **M1**

gives I_third = 0.25 A and states current splits at junction so sum of branches equals total (cao) **A1**

Answer: Third branch current = 0.25 A; at a junction current splits so sum of branch currents equals total

Question 5

uses R = V / I for both cases and substitutes R1 = 2.0 / 0.50 and R2 = 6.0 / 0.75 **M1**

calculates R1 = 4.0 ohm and R2 = 8.0 ohm **M1**

states that resistance is higher at 6.0 V because the larger current heats the filament more, raising its temperature and increasing its resistance cao **A1**

Answer: R at 2.0 V = 4.0 ohm; R at 6.0 V = 8.0 ohm; resistance increases with voltage because the larger current heats the filament, raising its temperature and resistance

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