

Resistivity

Question Paper

Level	A Level
Subject	Physics
Exam Board	Edexcel
Topic	Electric Circuits
Sub Topic	Resistivity
Booklet	Question Paper
Paper Type	Multiple Choice

Time Allowed: 14 minutes

Score: /11

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 An explorer walks 6 km due north from his camp and then 6 km due west.

What is the magnitude, in km, of the total displacement of the explorer?

- A 12
- B $\sqrt{12}$
- C 72
- D $\sqrt{72}$

(Total for Question = 1 mark)

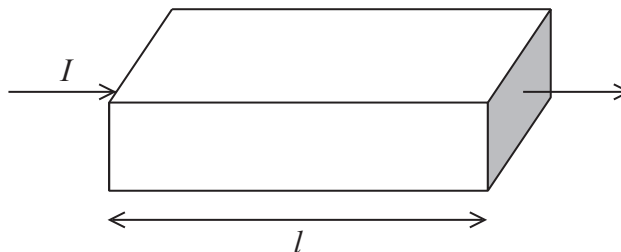
2 A sample of material has charge carrier density n and cross-sectional area A . When the current through the sample is I the drift velocity is v .

Another sample of the same material has double the cross-sectional area and the current through it is $2I$. What is the drift velocity?

- A $v / 2$
- B v
- C $2v$
- D $4v$

(Total for Question = 1 mark)

- 3 The diagram shows a current I flowing through a sample of material of length l and cross-sectional area A .



The drift velocity of the free electrons is v .

If the area and length are both doubled, but the current remains the same, the drift velocity will be

- A $v / 4$
- B $v / 2$
- C $2v$
- D $4v$

(Total for Question = 1 mark)

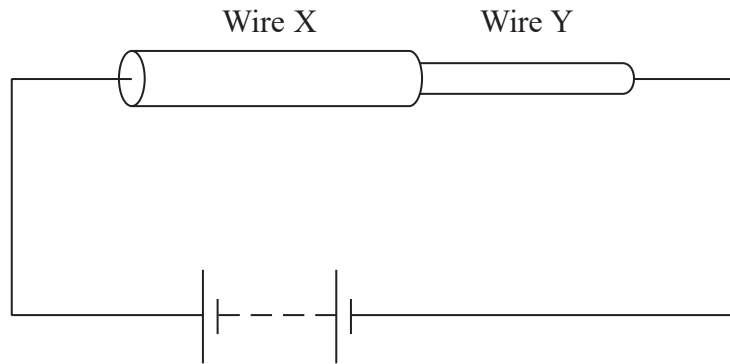
- 4 Two wires of the same material are connected in series with a potential difference across them. Wire A has twice the cross-sectional area of wire B.

The ratio $\frac{\text{drift speed of electrons in A}}{\text{drift speed of electrons in B}}$ equals

- A $\frac{1}{4}$
- B $\frac{1}{2}$
- C 2
- D 4

(Total for Question =1 mark)

- 5 Two wires of the same material are connected in series in the circuit shown.



The cross-sectional area of wire X is twice the cross-sectional area of wire Y.

The drift velocities of the electrons in these two wires are v_X and v_Y .

The value of $\frac{v_X}{v_Y}$ is

- A $\frac{1}{2}$
- B 1
- C 2
- D 4

(Total for Question = 1 mark)

- 6 Two wires of the same material are connected in series with each other. Wire A has twice the diameter of wire B. In which of the following rows are both statements correct?

		$\frac{\text{current in wire A}}{\text{current in wire B}}$	$\frac{\text{drift speed in wire A}}{\text{drift speed in wire B}}$
<input type="checkbox"/>	A	1	$\frac{1}{4}$
<input type="checkbox"/>	B	1	4
<input type="checkbox"/>	C	2	4
<input type="checkbox"/>	D	2	$\frac{1}{4}$

(Total for Question = 1 mark)

- 7 The drift velocity v of electrons in a conductor is directly proportional to

- A** electron charge.
- B** charge carrier density.
- C** cross-sectional area.
- D** current.

(Total for Question = 1 mark)

- 8 The resistance of a length of copper wire is R . A second piece of copper wire has twice the length and twice the cross-sectional area. The resistance of the second piece of copper wire is

- A** $3\ \Omega$
- B** $6\ \Omega$
- C** $12\ \Omega$
- D** $24\ \Omega$

(Total for Question = 1 mark)

9 The heating element for an electric fire is made from a wire of resistance R . It is replaced with a wire of the same material which has the same length but is twice the diameter. The resistance of this second wire is

- A $\frac{1}{4}R$
- B $\frac{1}{2}R$
- C $2R$
- D $4R$

(Total for Question = 1 mark)

10 The current through a wire of cross-sectional area A is I when the drift velocity of the electrons in the wire is v and the charge carrier density is n .

The wire is replaced with a wire of a different metal with half the charge carrier density but the same cross-sectional area A .

If the current in the new wire is $2I$, the drift velocity is

- A $v/2$
- B v
- C $2v$
- D $4v$

(Total for Question = 1 mark)

- 11 A copper wire of length 2.5 m and cross-sectional area $2.4 \times 10^{-7} \text{ m}^2$ has a resistivity of $1.7 \times 10^{-8} \Omega \text{ m}$.

What is the resistance of the wire?

- A $1.6 \times 10^{-15} \Omega$
- B $1.0 \times 10^{-14} \Omega$
- C 0.18Ω
- D 5.6Ω

(Total for Question = 1 mark)