FREE REVISION PACK

Mean Drift Velocity

Pearson Edexcel International Advanced Level Physics · Unit 2 (WPH12) · Specification points 73

Easy | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Calculating drift velocity	Edexcel IAL January 2020 · Unit 2 · Q5	1 mark
2	Easy	Meaning of n in I = nqvA	Edexcel IAL January 2025 · Unit 2 · Q1	1 mark
3	Easy	Terms in I = nqvA	Edexcel IAL October 2021 · Unit 2 · Q3	1 mark
4	Easy	Why drift velocity is small	Edexcel IAL October 2023 · Unit 2 · Q4	1 mark
5	Easy	Drift velocity in wires of different thickness	Edexcel IAL June 2025 · Unit 2 · Q10	1 mark

Key ideas to have ready

- I = nqvA: n = charge carriers per unit volume, q = charge on each, v = mean drift velocity, A = cross-sectional area.
- In metals n is huge (about 10^{28} m^{-3}), so v is very small.
- In series the current is the same, so $v \propto 1/(nA)$.
- Halving the diameter quarters the area and quadruples v.

How to use this pack

1. The questions are grouped into levels (Easy). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in Pearson's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

Questions 1–5

Choose **one** answer for each question and put a cross in the box next to it.

Edexcel IAL January 2020 · Unit 2 · Q5

1 A copper wire has a cross-sectional area of $5.0 \times 10^{-7}\,\text{m}^2$. There is a current in the wire of 0.93 A. Copper has 8.4×10^{28} conduction electrons per metre cubed.

Which of the following gives the magnitude of the drift velocity v in m s^{-1} for the conduction electrons in this wire?

☒ **A** $v = \dfrac{0.93}{(8.4 \times 10^{28})(5.0 \times 10^{-7})}$

☒ **B** $v = \dfrac{(8.4 \times 10^{28})(1.6 \times 10^{-19})(5.0 \times 10^{-7})}{0.93}$

☒ **C** $v = \dfrac{(8.4 \times 10^{28})(5.0 \times 10^{-7})}{0.93}$

☒ **D** $v = \dfrac{0.93}{(8.4 \times 10^{28})(1.6 \times 10^{-19})(5.0 \times 10^{-7})}$

Edexcel IAL January 2025 · Unit 2 · Q1

2 The formula for the current I in a conductor is $I = nqvA$.

Which of the following gives the meaning of n?

☒ **A** number of conduction electrons in a wire of length 1 m

☒ **B** number of conduction electrons in $1\,\text{m}^3$ of a material

☒ **C** total number of electrons in a wire of length 1 m

☒ **D** total number of electrons in $1\,\text{m}^3$ of a material

Edexcel IAL October 2021 · Unit 2 · Q3

3 The equation $I = nqvA$ relates the current in a sample of a material to the movement of free charge carriers in the sample.

Which of the following is a correct definition of one of the terms in this equation?

☒ **A** n represents the number of charge carriers in the sample.

☒ **B** q represents the total charge stored in the sample.

☒ **C** v represents the drift velocity of the charge carriers in the sample.

☒ **D** A represents the surface area of the sample.

Edexcel IAL October 2023 · Unit 2 · Q4

4 In a current-carrying copper wire, the drift velocity of the electrons is very small.

Which of the following best explains this?

- ☒ **A** The charge on an electron is very small.
- ☒ **B** The cross-sectional area of the wire is very small.
- ☒ **C** The current in the wire is very large.
- ☒ **D** The number of electrons per unit volume for copper is very large.

Edexcel IAL June 2025 · Unit 2 · Q10

5 Two wires, X and Y, are made of the same material. The wires are connected in series.
The current in the wires is I, as shown.



Wire X has twice the diameter of wire Y.

The mean drift velocity of electrons in wire X is v.

Which of the following is the mean drift velocity of electrons in wire Y?

- ☒ **A** $0.25\,v$
- ☒ **B** $0.5\,v$
- ☒ **C** $2\,v$
- ☒ **D** $4\,v$

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition:
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