GET BETTER AT PHYSICS · MARK SCHEME

Mean Drift Velocity: tiered multiple choice

Edexcel IAL Physics · Unit 2 (WPH12) · Specification points 73 · 5 questions · 5 marks

1 mark per correct letter | Worked reasoning for every question

How students did = from Pearson examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5
D	B	C	D	D

Easy

Questions 1–5

1 **D**

Calculating drift velocity · Edexcel IAL January 2020 · Unit 2 · Q5

$v = I/(nAq) = 0.93 \div ((8.4 \times 10^{28})(1.6 \times 10^{-19})(5.0 \times 10^{-7}))$. Option A forgets the charge on the electron.

How students did: Examiners named this among the best-answered multiple-choice questions on the January 2020 paper.

2 **B**

Meaning of n in I = nqvA · Edexcel IAL January 2025 · Unit 2 · Q1

n is the number density of charge carriers: the number of conduction (free) electrons per cubic metre of the material. It is not the total number of electrons, most of which are bound to atoms.

3 **C**

Terms in I = nqvA · Edexcel IAL October 2021 · Unit 2 · Q3

v is the (mean) drift velocity of the charge carriers. n is the number of charge carriers per unit volume (not in the whole sample), q is the charge on each carrier and A is the cross-sectional area.

4 **D**

Why drift velocity is small · Edexcel IAL October 2023 · Unit 2 · Q4

$I = nAvq$, so $v = I/(nAq)$. Copper has an enormous number of free electrons per unit volume ($n \approx 10^{28}$ m^{-3}), so only a very small drift velocity is needed to carry a normal current.

How students did: 63% of students got this right in October 2023.

5 **D**

Drift velocity in wires of different thickness · Edexcel IAL June 2025 · Unit 2 · Q10

In series, the current I is the same in both wires, and n and q are the same (same material). So $v \propto 1/A$. Y has half the diameter, so a quarter of the cross-sectional area, and its drift velocity is 4v.

Watch out: Area depends on diameter squared.

End of mark scheme. Answers from Pearson's published mark schemes; explanations written for this pack. Pearson Edexcel material is © Pearson Education Ltd. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**

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