

Multiple Choice Answers

Q36: D

Multiple Choice Answers

Q31: D

Q32: C

Q33: A

Multiple Choice Answers

Q37: A

6(a)(i)	$I = 1.3 / 1.1$ $= 1.2 \text{ A}$
6(a)(ii)	$v = I / nqA$ $= 1.2 / (8.5 \times 10^{28} \times 1.60 \times 10^{-19} \times 4.7 \times 10^{-7})$
	$= 1.9 \times 10^{-4} \text{ m s}^{-1}$
6(a)(iii)	$\rho = RA / L$
	$= (1.1 \times 4.7 \times 10^{-7}) / 0.45$
	$= 1.1 \times 10^{-6} \Omega \text{ m}$
6(b)(i)	(Total) resistance decreases (and the potential difference stays the same)
	(so the reading on the ammeter) increases
6(b)(ii)	(The average drift speed will be) the same because the current is the same (in X).

1(a)	Value for x in range 8.0–14.0 cm with unit.
	Non-zero value for I less than 2.00 mA with unit.
1(b)	Six sets of readings of x (different values) and I with correct trend (as x increases, I decreases) and without help from Supervisor scores 5 marks, five sets scores 4 marks etc.
	Range: $x_{\min} \leq 5.0 \text{ cm}$ and $x_{\max} \geq 16.0 \text{ cm}$.
	Column headings: Each column heading must contain a quantity and a unit where appropriate. The presentation of quantity and unit must conform to accepted scientific convention e.g. $\sqrt{I} \text{ (mA}^{1/2}\text{)}$, $\sqrt{I} / \text{mA}^{1/2}$.
	Consistency: All values of x must be given to the nearest millimetre.
	Significant figures: Values of $\sqrt{I}$ must be given to the same number of s.f. as (or one more than) the number of s.f. in I .
	Calculation: Values of $\sqrt{I}$ calculated correctly.
1(c)(i)	Axes: Axes must be labelled with the required quantities. Scales must be chosen so that the plotted points occupy at least half the graph grid in both the x and y directions. Scale markings are no more than 2 cm (one large square) apart. Sensible scales must be used, no awkward scales (e.g. 3:10 or fractions).
	Plotting of points: All observations in the table must be plotted on the grid. Diameter of plotted points must be $\leq$ half a small square. Points must be plotted to an accuracy of half a small square in both x and y directions.
	Quality: General trend of points must be negative. All points in the table must be plotted (at least 5) for this mark to be awarded. It must be possible to draw a straight line that is within $\pm 2.0 \text{ cm}$ (to scale) on the x -axis of all plotted points.
1(c)(ii)	Line of best fit: 'Best fit' is judged by the balance of all points on the grid (at least 5 points) about the candidate's line. There must be an even distribution of points either side of the line along the full length. Lines must not be kinked or thicker than half a square.
	Some candidates may choose to identify an anomalous point. If 6 or more points are plotted and they identify one point as anomalous (e.g. by circling or labelling) then this point is to be disregarded when judging the line of best fit.
1(c)(iii)	Gradient: The hypotenuse of the triangle used must be greater than half the length of the drawn line. Both read-offs must be accurate to half a small square in both the x and y directions. Method of calculation must be correct, not $\Delta x / \Delta y$. Gradient sign on answer line must be consistent with graph drawn.
	y -intercept: Correct read-off from a point on the line is substituted into $y = mx + c$ or an equivalent expression. Read-off accurate to half a small square in both x and y directions. Or Intercept read directly from the graph, with read-off at $x = 0$, accurate to half a small square in y direction.
1(d)	a = candidate's gradient value and b = candidate's intercept value. Values must not be written as fractions or given to only one significant figure.
	Units for a and b are correct (e.g. $\text{mA}^{1/2} \text{ cm}^{-1}$ for a and $\text{mA}^{1/2}$ for b).