Name of the Student:_____

Max. Marks : 23 Marks   **Time : 23 Minutes**

Mark Schemes

Q1.

Question Number	Acceptable answers	Additional guidance	Mark
	• Equates $F = Bev$ and $F = eE$ (1) • Substitutes $E = V/d$ (1) Or $F = eV/d$ seen • Replaces v with I/neA (1) • Substitute $A = d \times t$ and leads to given equation (1) Alternative: • Equates $F = BIl$ and $F = QE$ with Q identified as total charge (1) • Substitutes $E = V/d$ Or $F = QV/d$ seen • Substitutes $Q = neAl$ and cancels l • Substitute $A = d \times t$ and leads to given equation	Example of derivation: $Bev = eE$ $Bev = eV/d$ $$\frac{BI}{neA} = \frac{V_H}{d}$$ $$V_H = \frac{BI}{net}$$ Alternative: $BIl = QE$ Total charge $Q = neAl$ $BIl = neAlE$ $BI = neAV_H/d$ $V_H = BI/net$	(4)

Q2.

Question Number	Answer	Mark
	B	1

Q3.

Question Number	Answer		Mark
(a)(i)	**Max 2** Inconsistent number of significant figures or decimal places **Or** results recorded to different precision /resolution No repeat readings More readings needed up to <u>1.5</u> cm	(1) (1) (1)	2
(a)(ii)(1)	Attempt to use Vr = constant Correctly finds two values of Vr from values in table **and** makes comment **Or** uses Vr value with another r or V to confirm corresponding value **and** makes comment <u>Example of calculation</u> | r/cm	V/V	rV/ cmV | |---|---|---| | 1.0 | 0.725 | 0.725 | | 1.5 | 0.483 | 0.725 | | 2.0 | 0.363 | 0.726 | | 2.5 | 0.29 | 0.725 | | 3.0 | 0.242 | 0.726 | | 3.5 | 0.21 | 0.735 |	(1) (1)	2
(a)(ii)(2)	The graph would be a straight line graph through the origin. (accept a sketch of a straight line graph going through the origin graph)	(1)	1
(b)(i)	An e.m.f. is (induced) when there is a changing (magnetic) field/flux. Because the <u>current</u> is constant there is a constant magnetic field. **Or** Because the <u>current</u> is constant there isn't a changing magnetic field.	(1) (1)	2
(b)(ii)	 Movement of either the coil or the wire Use an alternating current/signal/supply/AC Switch the current on/off **Or** change current e.g. use of variable resistor	(1) (1) (1)	3
	Total for question		10

Q4.

Question Number	Answer		Mark
(a)	Only (moving) charged particles are deflected by a magnetic field	(1)	
	Or		
	Only charged particles can be accelerated to produce a beam	(1)	1
(b)	Into the page	(1)	1
(c)	Use of $F = mv^2/r$ **Or** use of $r = p/BQ$	(1)	
	Use of $F = Bqv$ **Or** use of $p = mv$	(1)	
	$m = 6.64 \times 10^{-26}$ kg	(1)	3
	Example of calculation $mv^2/r = Bqv$ $m = Bqr/v = (0.673\ \text{T} \times 1.6 \times 10^{-19}\ \text{C} \times 7.40 \times 10^{-2}\ \text{m}) / 1.20 \times 10^{5}\ \text{m s}^{-1}$ $m = 6.64 \times 10^{-26}$ kg		
(d)	Semicircle drawn starting from same initial point <u>and</u> a smaller radius	(1)	1
	Total for question		6