Practice Question Set For A-Level
**Subject : Physics**
**Paper-1 Topic : 7_ Magnetic Field 2**

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

**Name of the Student**:_____
**Max. Marks : 20 Marks** **Time : 20 Minutes**

Mark Schemes

**Q1.**

| Question Number | Answer | Additional guidance | Mark |
|---|---|---|---|
| **(a)(i)** | thermionic emission | | **(1)** |

| Question Number | Acceptable Answer | Additional guidance | Mark |
|---|---|---|---|
| **(a)(ii)** | • equate $\frac{1}{2}mv^2$ and $VQ$ (1)<br>• $v = 2.3 \times 10^7$ m s$^{-1}$ (1) | Example of calculation:<br>$E = 1500\text{ V} \times 1.6 \times 10^{-19}\text{ C} = 2.4 \times 10^{-16}\text{ J}$<br>$v = \sqrt{\frac{2 \times 2.4 \times 10^{-16}\text{ J}}{9.11 \times 10^{-31}\text{ kg}}} = 2.3 \times 10^7$ m s$^{-1}$ | **(2)** |

| Question Number | Acceptable Answer | Additional guidance | Mark |
|---|---|---|---|
| **(b)(i)** | • use of $F = EQ$ and $E = \frac{V}{d}$ (1)<br>OR see $F = \frac{VQ}{d}$<br>• equate $F = ma$ and $F = EQ$ (1) | | **(2)** |

Downloaded from www.merit-minds.com

| Question Number | Acceptable Answer | Additional guidance | Mark |
|---|---|---|---|
| **(b)(ii)** | • use of speed = distance/time (1)<br>• $t = 8.7 \times 10^{-10}$ (s) (1)<br>• use of $a = \frac{VQ}{dm}$ (1)<br>• use of $s = ut + \frac{1}{2}at^2$ (1) with $u = 0$ and vertical acceleration to find $s$<br>• $s = 3.3 \times 10^{-4}$ m (1) | Example of calculation:<br>$t = \frac{0.02\text{ m}}{2.3\times10^{7}\text{ m s}^{-1}} = 8.7 \times 10^{-10}$ s<br>$s = \frac{1}{2} \times \left( \frac{50\text{ V} \times 1.6 \times 10^{-19}\text{ C}}{0.01\text{ m} \times 9.11 \times 10^{-31}\text{ kg}} \right) \times (8.7 \times 10^{-10}\text{ s})^2$<br>$s = 3.3 \times 10^{-4}$ m | **(6)** |

| Question Number | Acceptable Answer | Additional guidance | Mark |
|---|---|---|---|
| **(c)** | • use of $V = V_0/\sqrt{2}$ (1)<br>• vertical line (1)<br>• positive and negative deflection shown (1)<br>• maximum deflection 75 V (1) | Example of calculation:<br>$V_0 = 53\text{ V} \times \sqrt{2} = 75\text{ V}$ | **(4)** |

**Q2.**

| Question Number | Acceptable answers | Additional guidance | Mark |
|---|---|---|---|
| (i) | • Use of $R=\rho l/A$ (1)<br>• Using $A=0.5\times28$ ($\times10^{-6}$ m$^2$) (1)<br>• Use of $V=IR$ (1)<br>• $I = 22$ (mA) (1) | Example of calculation<br>$R = \frac{1.6\Omega\text{m} \times 0.6\times10^{-3}\text{ m}}{0.5\times10^{-3}\text{ m} \times 28\times10^{-3}\text{ m}}$<br>$R = 68.6\Omega$<br>$1.5V = I \times 68.6\Omega$<br>$I = 1.5\text{V} / 68.6\Omega$<br>$I = 0.022\text{A} = 22\text{mA}$ | 4 |

Downloaded from www.merit-minds.com

| Question Number | Acceptable answers | | Additional guidance | Mark |
|---|---|---|---|---|
| (ii) | • Use of $F=BIL$ ecf values from (i)<br>• Force = $5.3 \times 10^{-6}$ N | (1)<br>(1) | Use of show that values gives $4.8 \times 10^{-6}$ N<br><br>Example of calculation<br>$F = 0.40\text{T} \times 0.022\text{A} \times 0.6 \times 10^{-3}\,\text{m}$<br>$F = 5.3 \times 10^{-6}\,\text{N}$ | 2 |

Downloaded from www.merit-minds.com