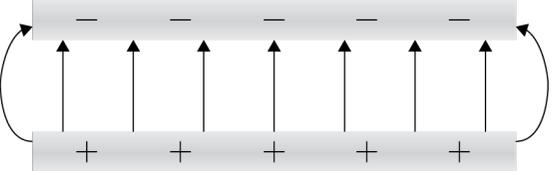
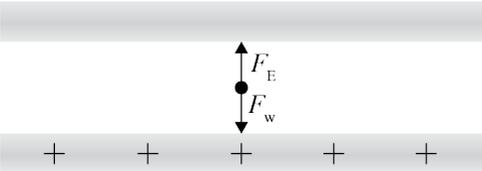


Assessment Schedule – 2025

Physics: Demonstrate understanding of electricity and electromagnetism (91173)

Evidence Statement

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)		<ul style="list-style-type: none"> Arrows evenly spaced upwards. OR One arrow up and negative plate labelled.		
(b)	$E = \frac{F}{Q} = \frac{9.6 \times 10^{-4}}{4.8 \times 10^{-10}} = 2 \times 10^6 \text{ N C}^{-1} \text{ or V m}^{-1}$ $V = Ed = 2 \times 10^6 \times 1 \times 10^{-3} = 2000 \text{ V}$	<ul style="list-style-type: none"> E calculated correctly. 	<ul style="list-style-type: none"> Correct voltage calculated. 	
(c)	$E = \frac{V}{d} = \frac{4000}{0.001} = 4 \times 10^6$ $q = 4 \times 10^9 \times 1.6 \times 10^{-19} = 6.4 \times 10^{-10}$ $E_p = Eqd = 4 \times 10^6 \times 6.4 \times 10^{-10} \times 0.001 = 2.56 \times 10^{-6}$ $E_p = \frac{1}{2}mv^2$ $2.56 \times 10^{-6} = \frac{1}{2} \times 1.02 \times 10^{-11} \times v^2$ $v = 708 \text{ m s}^{-1}$	<ul style="list-style-type: none"> Shows $q = 6.48 \times 10^{-10}$ OR Substitutes into $Eqd = \frac{1}{2}mv^2$ and calculates v . OR Finds v using E as E_p .	<ul style="list-style-type: none"> Finds v with one error. 	<ul style="list-style-type: none"> Correct.

<p>(d)</p>	<ul style="list-style-type: none"> The gravitational force acting on a droplet is acting downwards. Electrostatic force is upward. Balance: When the gravitational force equals the electric force, the droplet is suspended. For the electric force to be upward, the ink droplet must have a positive charge opposite to the top plate. 	<ul style="list-style-type: none"> One correct statement. <p>OR</p> <ul style="list-style-type: none"> One force arrow correctly labelled on diagram. 	<ul style="list-style-type: none"> Two linked statements. <p>OR</p> <ul style="list-style-type: none"> Both force arrows correctly labelled and of equal length. 	<ul style="list-style-type: none"> Full explanation.
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NØ	N1	N2	A3	A4	M5	M6	E7	E8
<p>No response; no relevant evidence.</p>	<p>Very little Achievement evidence. 1a</p>	<p>Some evidence at the Achievement level, but most is at the Not Achieved level. 1a or 1m</p>	<p>A majority of the evidence is at the Achievement level. 2a or 1a, 1m or 1e</p>	<p>Most evidence is at the Achievement level. 3a or 1m, 2a or 1e, 1a</p>	<p>Some evidence is at the Merit level. 2m, 1a</p>	<p>A majority of the evidence is at the Merit level. 3m or 2m, 2a</p>	<p>Evidence is provided for most tasks. The evidence at the Excellence level may have minor errors, or the evidence is weak. 1e, 1m, 2a</p>	<p>Evidence is provided for most tasks and the evidence at the Excellence level is accurate. 2e</p>

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
TWO (a)	$V = IR \Rightarrow I = \frac{V}{R} = \frac{240}{1000} = 0.24 \text{ A}$	<ul style="list-style-type: none"> • Correct. 		
(b)	Decreasing the resistance of the rheostat would increase the current through the rheostat. Because the total voltage is fixed at 240 V and the rheostat gets 240 V, this would increase the power output.	<ul style="list-style-type: none"> • Decrease R and 240 V fixed. 	<ul style="list-style-type: none"> • Decrease R, 240 fixed and rheostat gets 240 V. 	
(c)(i) (ii)	$R \text{ of element} = \frac{V^2}{P} = \frac{240^2}{1800} = 32 \Omega$ $\frac{1}{R_t} = \frac{1}{1000} + \frac{1}{32} + \frac{1}{480 + 480} \Rightarrow R_t = 30.0 = 30 \Omega$ $V = IR \Rightarrow I = \frac{240}{30} = 8 \text{ A}$ <p>OR Lamp: $V = IR \Rightarrow I = \frac{240}{1000} = 0.24 \text{ A}$</p> <p>Element: $P = IV \Rightarrow I = \frac{1800}{240} = 7.5 \text{ A}$</p> <p>Fans: $V = IR \Rightarrow I = \frac{240}{960} = 0.25 \text{ A}$</p> <p>Total $I = 8 \text{ A}$</p> <p>In 5 minutes $Q = It = 8 \times 5 \times 60 = 2400 \text{ C}$</p>	<ul style="list-style-type: none"> • Any ONE of: <ul style="list-style-type: none"> - (i) - $300 \times$ any calculated current - current through any single branch found. 	<ul style="list-style-type: none"> • Correct with one error. 	<ul style="list-style-type: none"> • Correct answer.
(d)	<p>When the lamp stops working, this removes a pathway and increases the total resistance of the circuit. This will lower the total current in the circuit because the supply voltage is fixed at 240 V.</p> <p>However, this will have no effect on the power output of the element as it still gets the full 240 V, so the current going through it will remain the same ($P = IV$); so too will its power output.</p>	<ul style="list-style-type: none"> • ONE correct statement. 	<ul style="list-style-type: none"> • TWO linked statements. 	<ul style="list-style-type: none"> • Full explanation.

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response; no relevant evidence.	Very little Achievement evidence.	Some evidence at the Achievement level, but most is at the Not Achieved level. 1a or 1m	A majority of the evidence is at the Achievement level. 2a or 1m, 2a, 1m or 1e	Most evidence is at the Achievement level. 3a or 1m, 2a or 1e, 1a	Some evidence is at the Merit level. 2m, 1a	A majority of the evidence is at the Merit level. 3m or 2m, 1a	Evidence is provided for most tasks. The evidence at the Excellence level may have minor errors, or the evidence is weak. 1e, 1m, 2a	Evidence is provided for most tasks and the evidence at the Excellence level is accurate. 2e

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
THREE (a)	B is north.	<ul style="list-style-type: none"> • Correct. 		
(b)(i) (ii) (iii)	<p>Current is B to A or equivalent.</p> <p>Force on CD is 15 N downwards. Force on BC is 0 N.</p> <p>Maximum force on CD as magnetic field is perpendicular to the current in the conductor. Force on BC is 0 N. Current in the conductor is parallel to magnetic field.</p>	<ul style="list-style-type: none"> • Correct current direction. OR Force on CD = 15 N down. OR Force on BC = 0N. 	<ul style="list-style-type: none"> • Force on CD = 15 N down and force on BC = 0 N and correct current direction. 	<ul style="list-style-type: none"> • Force on CD = 15 N down and force on BC = 0 N, correct current direction, and a link to either current is parallel to field for BC or perpendicular for CD.
(c)	$F = BIL \Rightarrow I_t = \frac{F}{BL} = \frac{15}{1.7 \times 0.5} = 17.6 \text{ A} \Rightarrow I_{1 \text{ coil}} = \frac{17.6}{40} = 0.44 \text{ A}$ <p>OR</p> $\frac{F}{40} = \frac{15}{40} = 0.375 \text{ N per wire}$ <p>And $0.375 = 1.7 \times I \times 0.5 \Rightarrow I = 0.44 \text{ A}$</p>	<ul style="list-style-type: none"> • $I_{\text{tot}} = 17.6\text{A}$ OR 0.375 N. 	<ul style="list-style-type: none"> • $I_{1 \text{ coil}} = 0.44 \text{ A}$ 	
(d)(i) (ii)	$V = BvL \Rightarrow v = \frac{6}{1.7 \times 0.5 \times 40} = 0.18 \text{ m s}^{-1} \text{ (6V as DC also 6V)}$ <p>Max voltage when the coil is in the position shown.</p>	<ul style="list-style-type: none"> • 0.35 or 7.1 or 14.1 m s^{-1}. OR (ii) 	(i).	<ul style="list-style-type: none"> • (i) and (ii).

NØ	N1	N2	A3	A4	M5	M6	E7	E8
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Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 7	8 – 13	14 – 18	19 – 24