

- 1 (a) (a liquid evaporates) at any temperature/below the boiling point/over a range of temperatures/below 100°C/at different temperatures/not at a fixed temperature B1
- (during evaporation) vapour forms at/escapes from the surface of the liquid B1
- (without a supply of thermal energy,) evaporation continues/occurs/doesn't stop
OR causes liquid to cool/is slower/reduces
- (b) (i) $(Q =) mL$ C1
OR $0.075 \times 2.25 \times 10^6$
- $1.7 \times 10^5 \text{ J}$ A1
- (ii) $(E =) VI t$ OR $240 \times 0.65 \times (20 \times 60)$ C1
OR $P = IV$ and $P = E/t$ OR energy/time
- $1.9 \times 10^5 \text{ J}$ A1
- (iii) energy is transferred to the surroundings
OR in heating the surroundings/air/atmosphere/hot-plate

[Total: 8]

- 2 (a) (i) negative at LH end **and** positive at RH end B1
- (ii) (+ve) charge on A attracts electrons/-ve charges/-ve ions B1
 OR unlike charges attract (ignore reference to + charges) B1
electrons move to end X/towards A B1
 (unbalanced) +ve charges (left) at end Y NOT repelled to Y B1
- (iii) idea that each electron leaves behind an equal unbalanced proton B1
 in nucleus/B has no net charge/B is neutral/idea that B has not
 gained or lost any charges B1
- (b) nothing OR nothing implied B1
- (ii) +ve charge cancelled/neutralised B1
 by electrons/negative charges flowing up from earth B1

[Total: 8]

- 3 (a) (E =) Pt symbols or numbers OR $100 \times 13 \times 3600$ OR 0.1×13
 OR 3 960 000 OR 4 320 000 C1
 4 680 000 J OR 4.68 MJ OR 1.3 kWh OR 1300 Wh A1
- (b) **EITHER**
- $I = P/V$ in any form OR P/V OR 100/250 OR 0.4 A C1
 $Q = It$ OR $0.4 \times 13 \times 3600$ OR candidate's current $\times 13 \times 3600$
 OR candidate's current \times candidate's time in s C1
- 18 720 C e.c.f A1
- OR**
- volts = joules/coulombs in any form C1
 $4680000/250$ OR candidate's E/250 C1
 18 720 C e.c.f A1
- (c) (lost as/changed to) heat/light OR lost to air/surroundings B1

[Total: 6]

4	<p>(a) increases (as current increases) at an increasing rate</p> <p>(b) 25 Ω</p> <p>(ii) IR in any form OR 0.070×25 1.7/1.8 V</p> <p>(iii) $(P =) IV$ OR I^2R OR V^2/R in any form, numbers, symbols or words 0.12 W e.c.f. from (i)/(ii)</p> <p>(c) answer to (b)(ii)</p> <p>(ii) use of $1/R = 1/R_1 + 1/R_2$ OR $R = R_1R_2/(R_1 + R_2)$ 12.5 Ω</p>	<p>M1 A1</p> <p>B1</p> <p>C1 A1</p> <p>C1 A1</p> <p>B1</p> <p>C A1</p>	<p>[Total: 10]</p>
---	---	--	---------------------------

5	<p>(a) bring rod close but not touching plate touch metal plate with earth lead remove lead and then rod</p> <p>(b) (i) $Q = 20 \text{ (mA)} \times 15 \text{ (s)}$ $= 0.30 \text{ C}$</p> <p>(ii) $V = 20 \text{ (ma)} \times 10 \text{ (k}\Omega\text{)}$ $= 200 \text{ V}$</p>	<p>M1 M1 A1</p> <p>C1 A1</p> <p>C1 A1</p>	<p>3</p> <p>M3 [6]</p>
---	--	---	---

6	(a)	force is produced on any charge placed in the field	B1 B1	[2]
	(b)	at least 3 parallel, straight lines plate to plate, ignore end effect at least one correct arrow, none wrong	B1 B1	[2]
	(c)	$q = It$ or $0.06 = I \times 30$ $I = 0.002$ A or 2 mA	C1 A1	[2]
	(d)	$E = Vit$ $= 1500 \times 0.008 \times 10$ $= 120$ J	C1 C1 A1	[3]
				Total [9]