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Cambridge IGCSE Physics 0625 style

ELECTRICITY – MARK SCHEME

Maximum mark: 46 (Core: 34). ";" separates marking points. Accept correct alternative wording. Apply error carried forward (ecf) where shown. Do not award a final-answer mark if the unit is wrong or missing, unless the unit is printed on the answer line.

Question	Answer	Marks	Guidance
1(a)	(rate of) flow of charge;	1	allow: flow of electrons / charge per unit time do not allow: flow of electricity / energy
1(b)	Q = It **or** 0.40 × 150; 60 C;	2	do not allow: 0.40 × 2.5 = 1.0 (time not in seconds) for 2nd mark
1(c)	coulomb / C;	1	
1(d)	V = W / Q **or** 360 / 60; 6.0 (V);	2	correct answer with no working: 2 marks
2(a)	variable resistor / rheostat; to change / control the current (and p.d.) in the circuit;	2	allow: so that several readings can be taken
2(b)	R = V / I **or** 6.0 / 0.30; 20 (Ω);	2	
2(c)	it halves / decreases to 0.15 A;	1	do not allow: "decreases" alone
2(d)	curve through the origin, steep near the origin; gradient decreases as V increases (curve flattens), shown in both directions / symmetrical in the third quadrant;	2	a correct shape in the first quadrant only: 1 mark do not allow: a straight line
2(e)	the filament gets hotter / its temperature increases;	1	allow: ions/atoms vibrate more so electrons collide more
2(f)	4.0 Ω; R is proportional to length and inversely proportional to area, so doubling both leaves R unchanged;	2	reason mark needs both ideas
3(a)	12 (Ω);	1	
3(b)	I = V / R **or** 12 / 12; 1.0 (A);	2	ecf from (a)
3(c)	V = IR **or** 1.0 × 8.0; 8.0 (V);	2	ecf from (b) allow: 12 × 8/12

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Question	Answer	Marks	Guidance
3(d)	1/R = 1/6.0 + 1/6.0; 3.0 (Ω);	2	allow: (6 × 6)/(6 + 6)
3(e)	current from battery = sum of currents in the branches;	1	allow: it is larger than each branch current / it is double each branch current
4(a)	I = P / V **or** 2000 / 230; 8.7 (A);	2	allow 8.70 A do not allow: 2.0 / 230 for 2nd mark
4(b)	E = Pt **or** 2000 × 180; 360 000 (J);	2	allow 3.6×10^5 J
4(c)	energy = 2.0 kW × 0.050 h = 0.10 kWh; cost = 0.10 × 25 = 2.5 (cents);	2	allow: 360 000 / 3 600 000 = 0.10 kWh
4(d)	kettle has a (much) larger current; thick wire has a lower resistance so it does not overheat;	2	allow: thin wire would get too hot / could cause a fire
5(a)	any two from: damaged insulation; overheating of cables; damp / wet conditions; overloading plugs or sockets;	2	allow: touching a live wire / electric shock as one hazard
5(b)	13 A; (lowest rating) just above the normal current / 3 A and 5 A would blow in normal use;	2	reason mark needs the idea of “just above” the normal current 13 A alone: 1 mark
5(c)	current flows from the case through the earth wire (to the ground); large current flows / current is much larger than normal; fuse melts / blows and breaks the circuit (live wire), so the case is no longer live;	3	allow: earth wire is a low-resistance path
5(d)	can be reset (without being replaced) / acts faster;	1	
6(a)	(electrical) work done by the source; in moving unit charge around a complete circuit;	2	allow: energy transferred per unit charge (by the source) around the circuit for 2 marks
6(b)	V_{out} = 8.0 × 2.0 / (2.0 + 6.0); 2.0 (V);	2	allow: current = 8.0/8000 = 1.0 mA, V = 1.0 mA × 2.0 kΩ
6(c)	output voltage increases; resistance of thermistor decreases, so the fixed resistor gets a larger share of the p.d.;	2	reason needed for 2nd mark

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