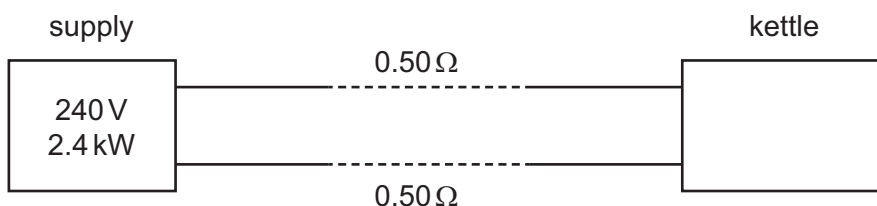


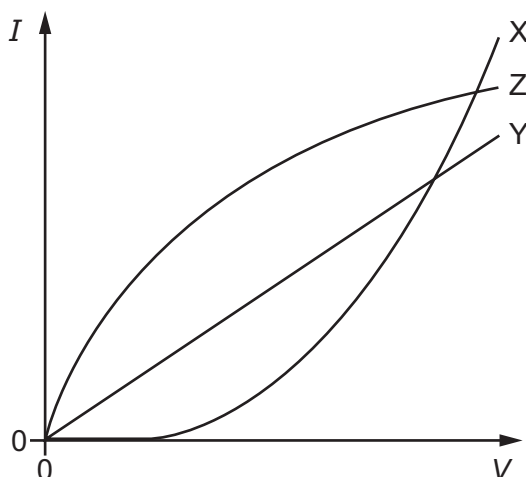
- 33 The power output of an electrical supply is 2.4 kW at a potential difference (p.d.) of 240 V. The two wires between the supply and a kettle each have a resistance of $0.50\ \Omega$, as shown.



What is the power supplied to the kettle and what is the p.d. across the kettle?

	power/kW	p.d./V
A	2.3	230
B	2.3	235
C	2.4	230
D	2.4	235

- 34 The graph shows the variation with potential difference V of the current I in components X, Y and Z.



Which row correctly identifies the components?

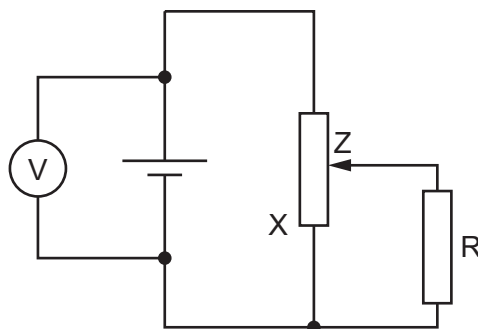
	metallic conductor at constant temperature	semiconductor diode	filament lamp
A	X	Z	Y
B	Y	X	Z
C	Y	Z	X
D	Z	Y	X

- 35 A wire of resistance $9.55\ \Omega$ has a diameter of $0.280\ \text{mm}$.

It is made of metal of resistivity $4.90 \times 10^{-7}\ \Omega\text{m}$.

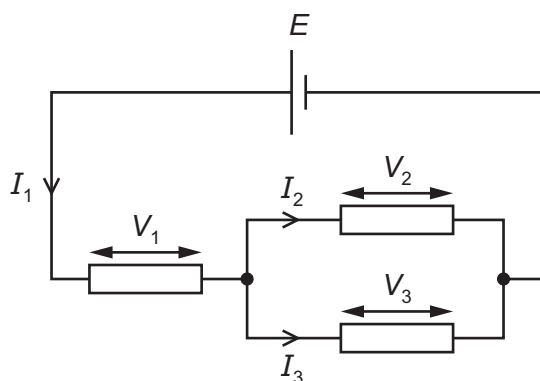
What is the length of the wire?

- A 1.20 m B 4.80 m C 19.0 m D 76.0 m
- 36 A cell of constant electromotive force (e.m.f.) but with internal resistance is connected to a fixed resistor R using a potentiometer. A voltmeter measures the potential difference (p.d.) between the terminals of the cell.



Which statement explains the change to the reading of the voltmeter as contact Z is moved towards end X of the potentiometer?

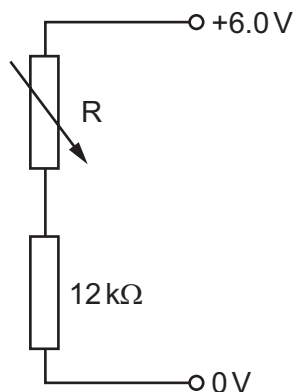
- A The voltmeter reading decreases because the current through the cell decreases.
 B The voltmeter reading decreases because the current through the cell increases.
 C The voltmeter reading increases because the current through the cell decreases.
 D The voltmeter reading increases because the current through the cell increases.
- 37 A cell of electromotive force (e.m.f.) E and negligible internal resistance is connected to a circuit. The circuit has currents I_1 , I_2 and I_3 , and potential differences V_1 , V_2 and V_3 , as shown.



Which equation represents a statement of Kirchhoff's first law?

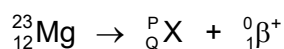
- A $I_1 = I_2 + I_3$ B $I_1 = I_2 = I_3$ C $E = V_1 + V_2$ D $V_1 = V_2 = V_3$

- 38 Two resistors are connected in series with a 6.0 V power supply, as shown.



What is the resistance of the variable resistor R to give a potential difference of 1.0 V across the 12 kΩ resistor?

- A 2.0 kΩ B 10 kΩ C 60 kΩ D 72 kΩ
- 39 A nucleus of magnesium decays into a nucleus X by emitting a β^+ particle. The decay is represented by the equation shown.



What are the values of P and Q?

	P	Q
A	22	11
B	22	13
C	23	11
D	23	13

- 40 In β^- decay, a neutron inside a nucleus changes to a proton.

Which statement describes the quark composition of the nucleus during the decay?

- A The number of down quarks decreases by one.
 B The number of down quarks increases by one.
 C The number of down quarks stays the same.
 D The number of up quarks stays the same.

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