

- 6 (a) State Kirchhoff's first law.
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[1]

- (b) A battery is connected to two resistors X and Y, as shown in Fig. 6.1.

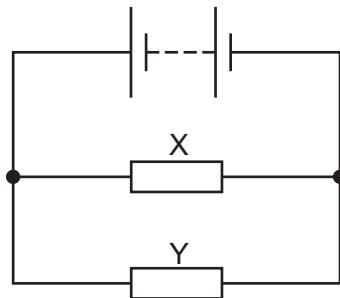


Fig. 6.1

The resistance of resistor X is greater than the resistance of resistor Y.

- (i) State and explain which resistor dissipates more power.
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[3]

- (ii) The two resistors are made of wires that have the same length. Both wires are made from metal of the same resistivity.

State and explain which resistor is made of wire with the larger cross-sectional area.

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[2]

- (c) A battery of electromotive force (e.m.f.) 9.0V and negligible internal resistance is connected in series with a light-dependent resistor (LDR) and a fixed resistor of resistance 1800Ω , as shown in Fig. 6.2.

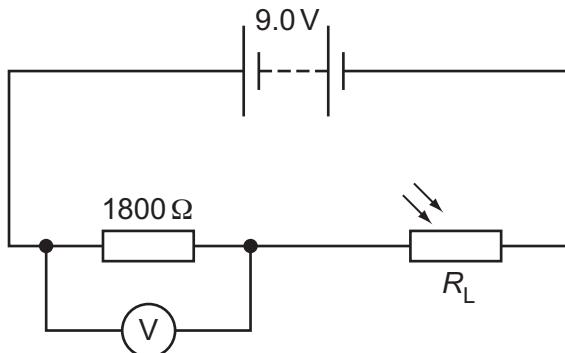


Fig. 6.2

A voltmeter is connected across the fixed resistor. The reading on the voltmeter is 5.4V.

- (i) Calculate the current in the circuit.

$$\text{current} = \dots \text{A} [1]$$

- (ii) Calculate the resistance R_L of the LDR.

$$R_L = \dots \Omega [2]$$

- (iii) The intensity of the light illuminating the LDR increases.

By reference to the current in the circuit, state and explain the change, if any, to the voltmeter reading.

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[2]