6 **(a)** Define the *ohm*.

.....

.....[1]

(b) A cell X of electromotive force (e.m.f.) 1.5 V and negligible internal resistance is connected in series to three resistors A, B and C, as shown in Fig. 6.1.

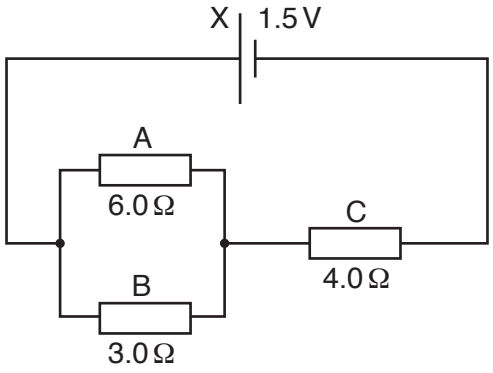

Fig. 6.1

Resistors A and B have resistances 6.0 Ω and 3.0 Ω respectively and are connected in parallel. Resistor C has resistance 4.0 Ω and is connected in series with the parallel combination.

Calculate

(i) the current in the circuit,

current = ...A [3]

(ii) the current in resistor B,

current = ...A [1]

(iii) the ratio

$$\frac{\text{power dissipated in resistor B}}{\text{power dissipated in resistor C}}.$$

ratio = ...[2]

(c) The resistors A, B and C in **(b)** are wires of the same material and have the same length.

(i) Explain how the resistors may be made with different resistance values.

.....[1]

(ii) Calculate the ratio

$$\frac{\text{average drift speed of the charge carriers in resistor B}}{\text{average drift speed of the charge carriers in resistor C}}.$$

ratio = ...[2]

(d) A cell of e.m.f. 1.5 V and negligible internal resistance is connected in parallel with cell X in Fig. 6.1 with their positive terminals together.

State the change, if any, to the current in

(i) cell X,

.....[1]

(ii) resistor C.

.....[1]

[Total: 12]