

- 5 Fig. 5.1 shows a 12V power supply with negligible internal resistance connected to a uniform metal wire AB. The wire has length 1.00m and resistance 10Ω . Two resistors of resistance 4.0Ω and 2.0Ω are connected in series across the wire.

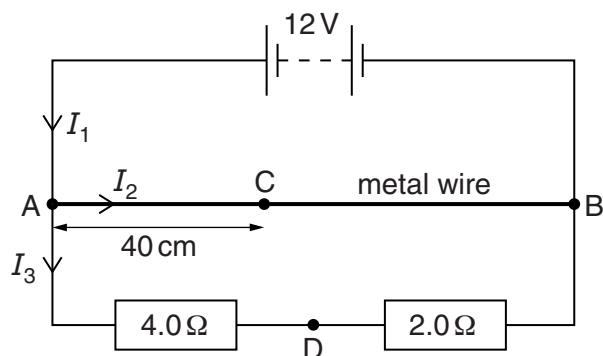


Fig. 5.1

Currents I_1 , I_2 and I_3 in the circuit are as shown in Fig. 5.1.

- (a) (i) Kirchhoff's first law to state a relationship between I_1 , I_2 and I_3 .

..... [1]

- (ii) Calculate I_1 .

$I_1 =$ A [3]

- (iii) Calculate the ratio x , where

$$x = \frac{\text{power in metal wire}}{\text{power in series resistors}}.$$

$x =$ [3]

- (b) Calculate the potential difference (p.d.) between the points C and D, as shown in Fig. 5.1. The distance AC is 40 cm and D is the point between the two series resistors.

p.d. = V [3]