

- 6 (a) Define the *ohm*.

..... [1]

- (b) A 15V battery with negligible internal resistance is connected to two resistors P and Q, as shown in Fig. 6.1.

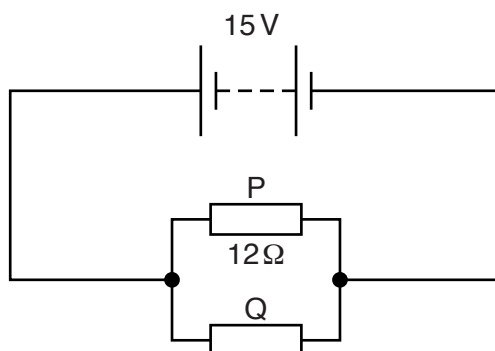


Fig. 6.1

The resistors are made of wires of the same material. The wire of P has diameter d and length $2l$. The wire of Q has diameter $2d$ and length l .

The resistance of P is 12Ω .

- (i) Show that the resistance of Q is 1.5Ω .

- (ii) Calculate the total power dissipated in the resistors P and Q.

[3]

power = W [3]

(iii) Determine the ratio

$$\frac{\text{average drift speed of the charge carriers in P}}{\text{average drift speed of the charge carriers in Q}}.$$

ratio = [3]

[Total: 10]