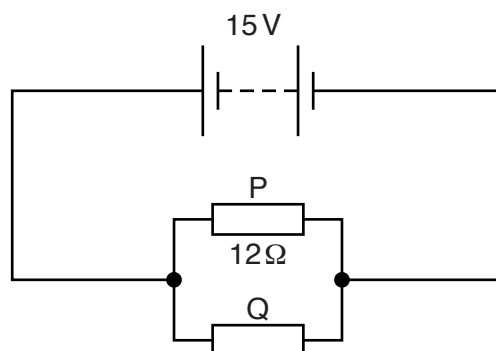


- 6 (a) Define the *ohm*.

..... [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  $12\,\Omega$ .

- (i) Show that the resistance of Q is  $1.5\,\Omega$ .

- (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]