

5 (a) State Ohm's law.

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.....
..... [2]

(b) The variation of current I with potential difference V for a filament lamp is shown in Fig. 5.1.

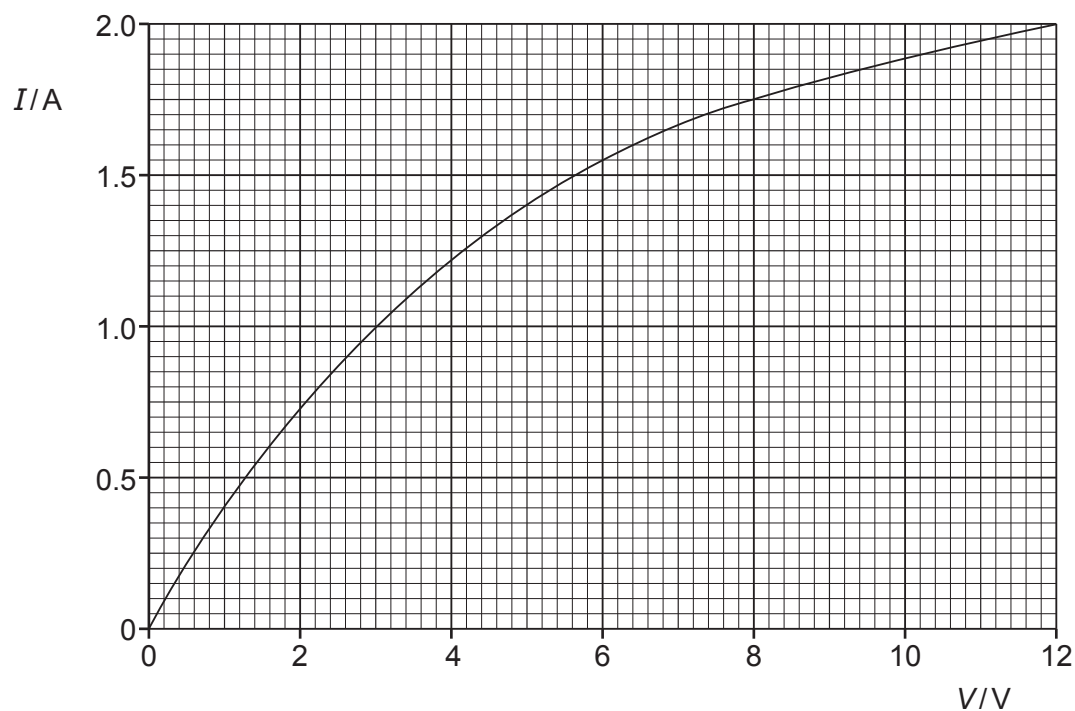


Fig. 5.1

The resistance of the filament lamp increases with potential difference.

(i) State how Fig. 5.1 shows this.

.....
..... [1]

(ii) Explain why the resistance varies in this way.

.....
..... [1]

- (c) Fig. 5.2 shows a circuit with a battery of electromotive force (e.m.f.) 12.0 V connected to a linear potentiometer AB and two identical filament lamps P and Q.

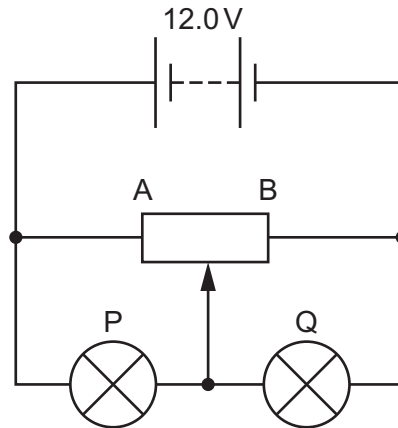


Fig. 5.2

The battery has negligible internal resistance and the lamps each have the same I - V characteristic shown in Fig. 5.1.

When the slider of the potentiometer is at its midpoint, as shown in Fig. 5.2, the current I in the battery is 1.78 A.

Determine:

- (i) the current in lamp P

current = A [1]

- (ii) the total power dissipated in lamps P and Q

total power = W [2]

- (iii) the resistance of the potentiometer between its ends A and B.

resistance = Ω [2]

- (d)** The slider of the potentiometer in **(c)** is moved to end A.

State and explain the effect on the brightness of lamps P and Q.

lamp P:

.....

lamp Q:

.....

[2]