

- 5 The variation with potential difference (p.d.) V of current I for a semiconductor diode is shown in Fig. 5.1.

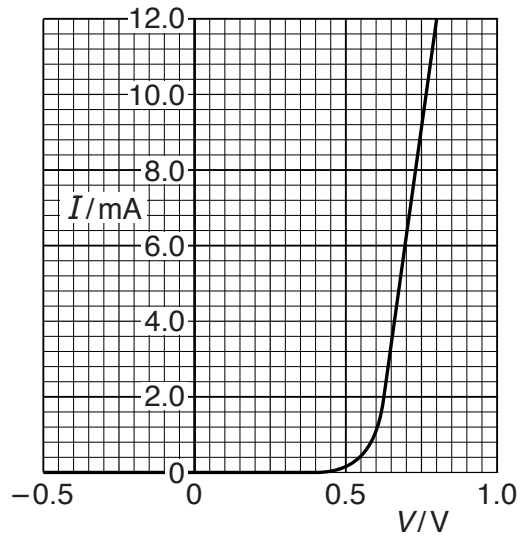


Fig. 5.1

- (a) Use Fig. 5.1 to describe the variation of the resistance of the diode between $V = -0.5\text{V}$ and $V = 0.8\text{V}$.

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[2]

- (b) On Fig. 5.2, sketch the variation with p.d. V of current I for a filament lamp. Numerical values are not required.

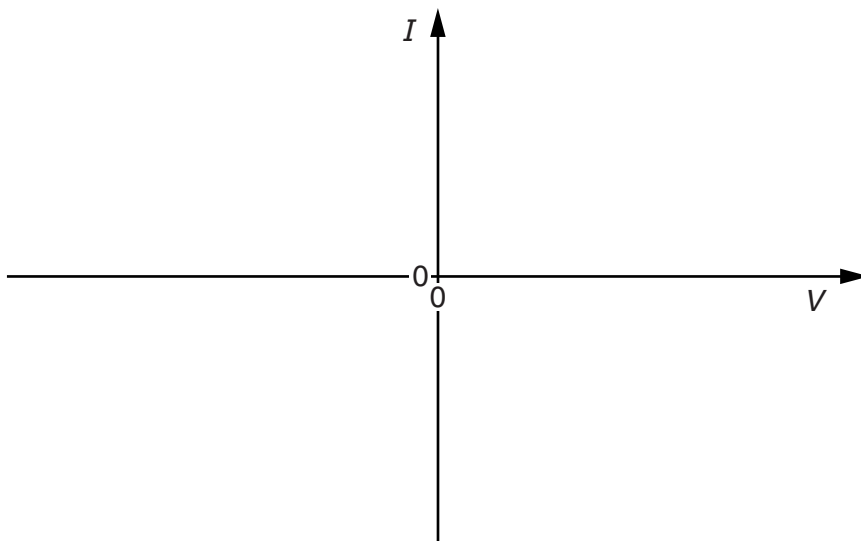


Fig. 5.2

[2]

- (c) Fig. 5.3 shows a power supply of electromotive force (e.m.f.) 12V and internal resistance 0.50Ω connected to a filament lamp and switch.

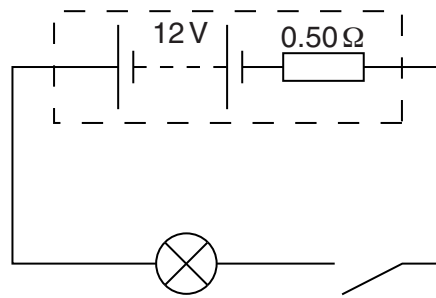


Fig. 5.3

The filament lamp has a power of 36W when the p.d. across it is 12V.

- (i) Calculate the resistance of the lamp when the p.d. across it is 12V.

resistance = Ω [1]

- (ii) The switch is closed and the current in the lamp is 2.8 A. Calculate the resistance of the lamp.

resistance = Ω [3]

- (d) Explain how the two values of resistance calculated in (c) provide evidence for the shape of the sketch you have drawn in (b).

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[1]