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

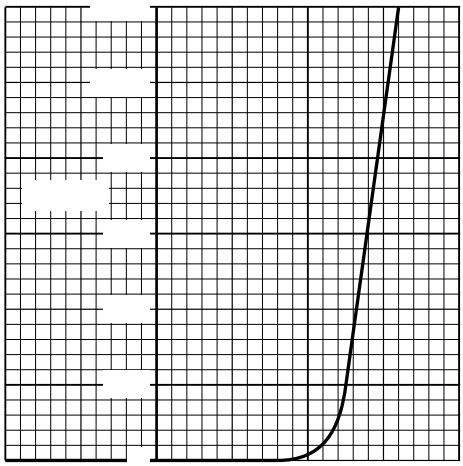

Fig. 5.1

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

.....

.....

.....

.....[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.

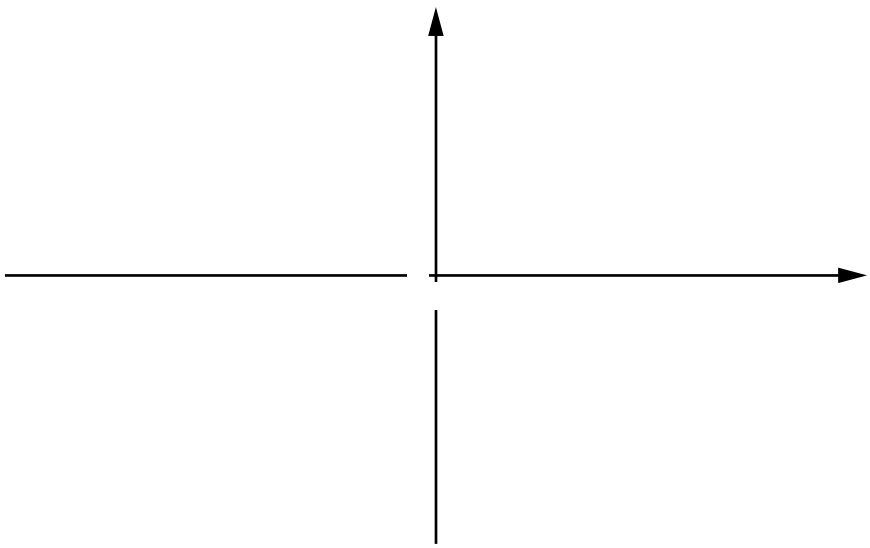

Fig. 5.2

[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.

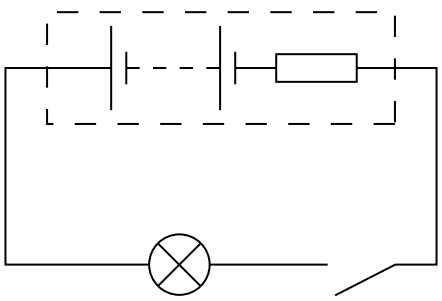

Fig. 5.3

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 2.8A. 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)**.

.....

.....[1]