5 **(a)** The I-V characteristic of a semiconductor diode is shown in Fig. 5.1.
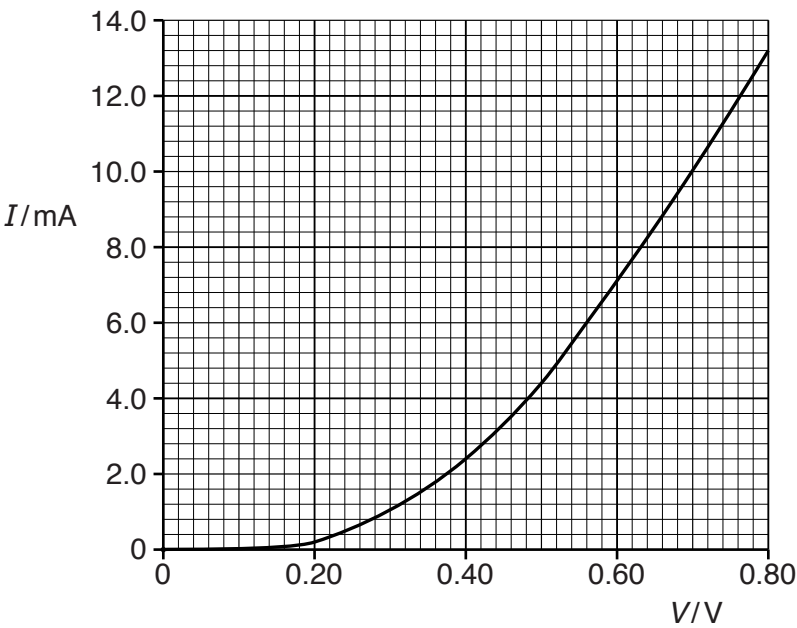

Fig. 5.1

(i) Fig. 5.1 to explain the variation of the resistance of the diode as V increases from zero to 0.8V.

....

....

....

....

....

....[3]

(ii) Fig. 5.1 to determine the resistance of the diode for a current of 4.4 mA.

resistance = ...Ω [2]

(b) A cell of e.m.f. 1.2V and negligible internal resistance is connected in series to a semiconductor diode and a resistor R_1, as shown in Fig. 5.2.
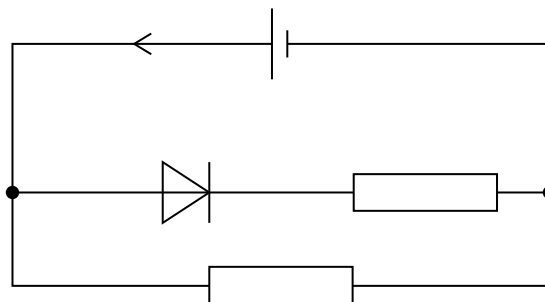

Fig. 5.2

A resistor R_2 of resistance 375 Ω is connected across the cell.
The diode has the characteristic shown in Fig. 5.1. The current supplied by the cell is 7.6mA.

Calculate

(i) the current in R_2,

current = ... A [1]

(ii) the resistance of R_1,

resistance = ... Ω [2]

(iii) the ratio

$$\frac{\text{power dissipated in the diode}}{\text{power dissipated in } R_2}.$$

ratio = ...[2]