2 **(a)** In the circuit shown in Fig. 2.1, the cell has an e.m.f. of 10 V and negligible internal resistance. The resistances of R_1 and R_2 are such that both lamps **A** and **B** are operating at their rated voltage.

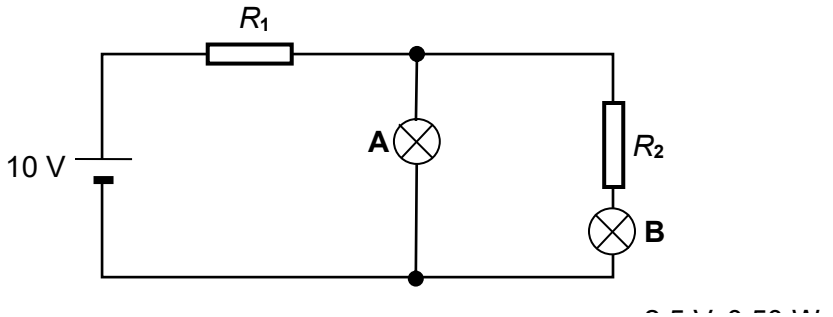


Fig. 2.1

Calculate the resistances of R_1 and R_2.

R_1 = …….. Ω

R_2 = …….. Ω [3]

(b) In the circuit shown in Fig. 2.2, the cell has an e.m.f. of 12 V and internal resistance of 10 Ω. It is connected in series with a 7 Ω resistor and R_3.

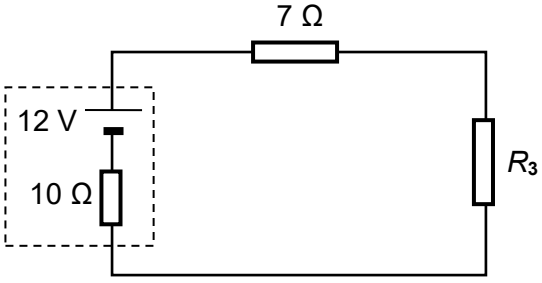
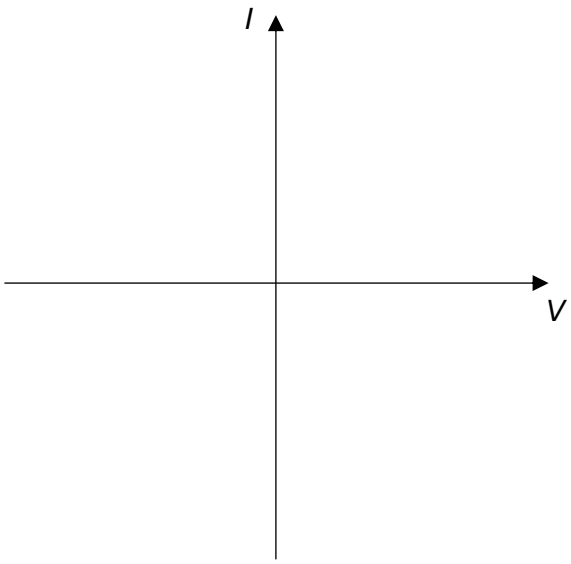


Fig. 2.2

State the resistance of R_3 such that there is maximum power delivered to R_3.

R_3 = …….. Ω [1]

(c) Sketch the current – voltage (I – V) characteristics of an *ideal* semiconductor diode.



[1]