

- 7 Fig. 7.1 shows an iron-cored transformer that is 90% efficient. The primary coil of the transformer has 2700 turns and is connected to a 240 V r.m.s. supply. The secondary coil has 450 turns and is connected, through an ideal diode to resistors X and Y.

Resistor X dissipates energy at a mean rate of 90 W and the resistance of Y is twice of X's.

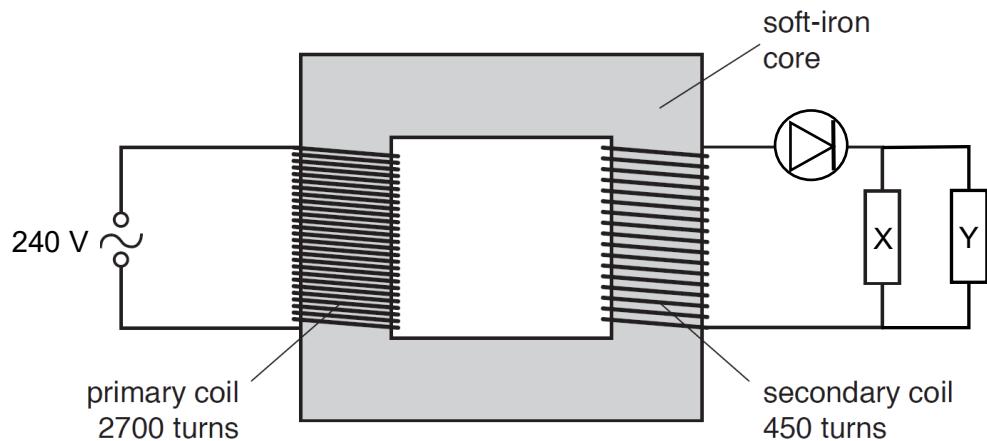


Fig. 7.1

(a) Calculate

(i) the peak voltage across the secondary coil,

$$\text{peak voltage} = \dots \text{V} [2]$$

(ii) the r.m.s. voltage across X,

r.m.s. voltage = V [1]

(iii) the r.m.s. current in the primary coil.

r.m.s. current = A [3]

(b) On Fig 7.2, show the variation with time t of the power P dissipated in resistor X for two periods of the alternating voltage supply. The alternating voltage supply has period T .

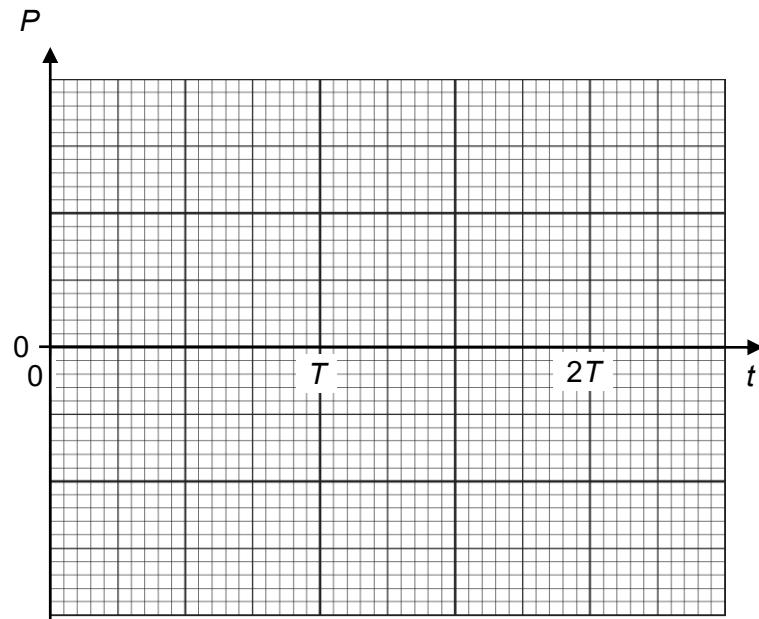


Fig. 7.2

[2]

[Total: 8]