

- 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.

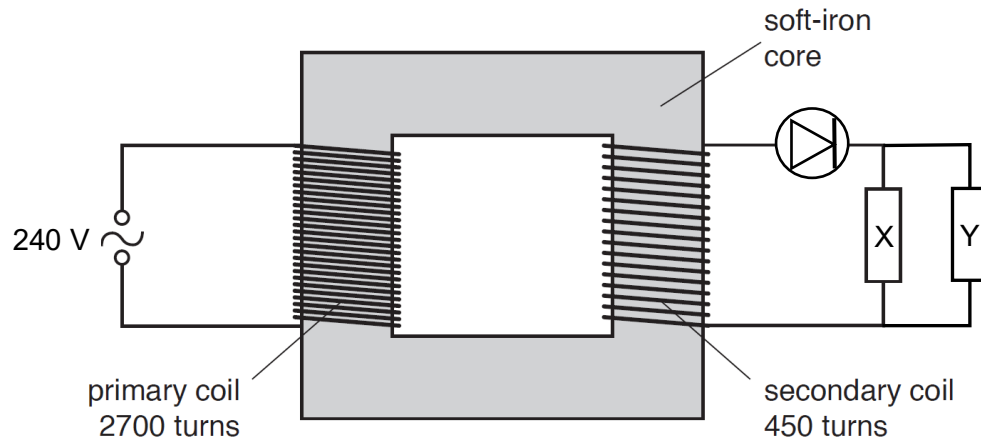


Fig. 7.1

- (a) Calculate  
(i) the peak voltage across the secondary coil,

peak voltage = ..... V [2]

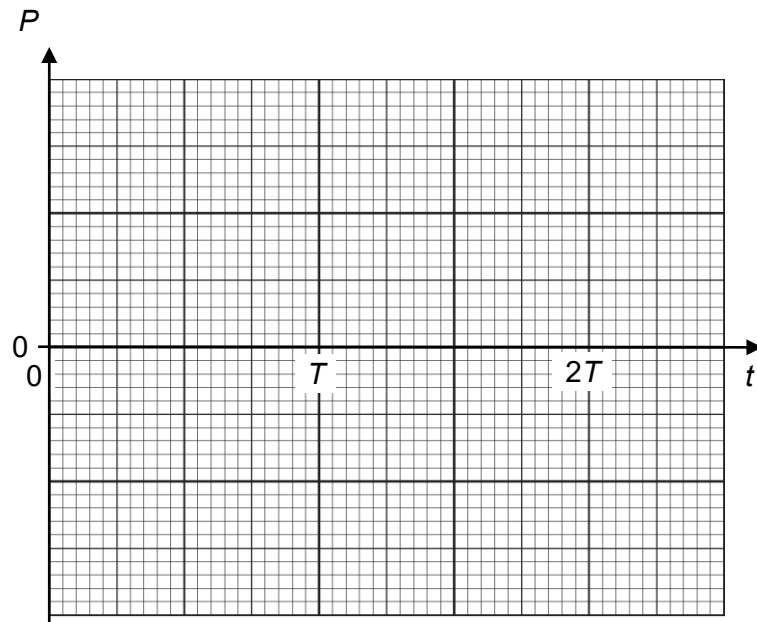
- (ii) the r.m.s. voltage across X,

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]