

- 10 Fig. 10.1 shows a simple laminated iron-cored transformer consisting of a primary coil of 25 000 turns and a secondary coil of 625 turns.

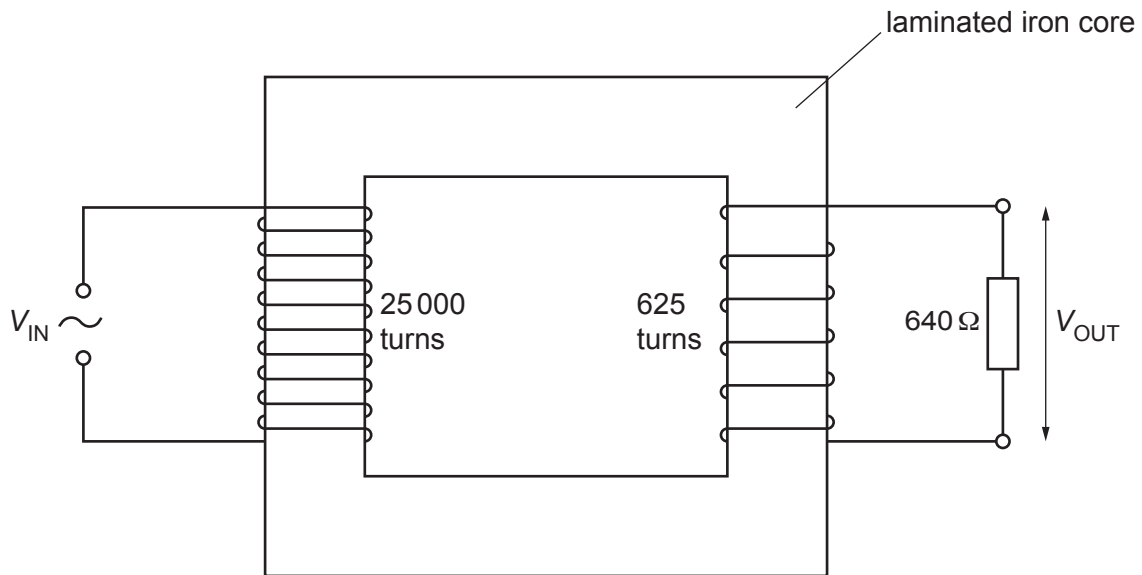


Fig. 10.1

The output potential difference (p.d.)  $V_{OUT}$  is applied to a load resistor of resistance  $640\ \Omega$ .

- (a) (i) State the function of the iron core.

.....  
..... [1]

- (ii) Explain why the iron core is laminated.

.....  
.....  
..... [2]

- (b) The input p.d.  $V_{IN}$  is a sinusoidal alternating voltage of peak value 12 kV and period 40 ms.

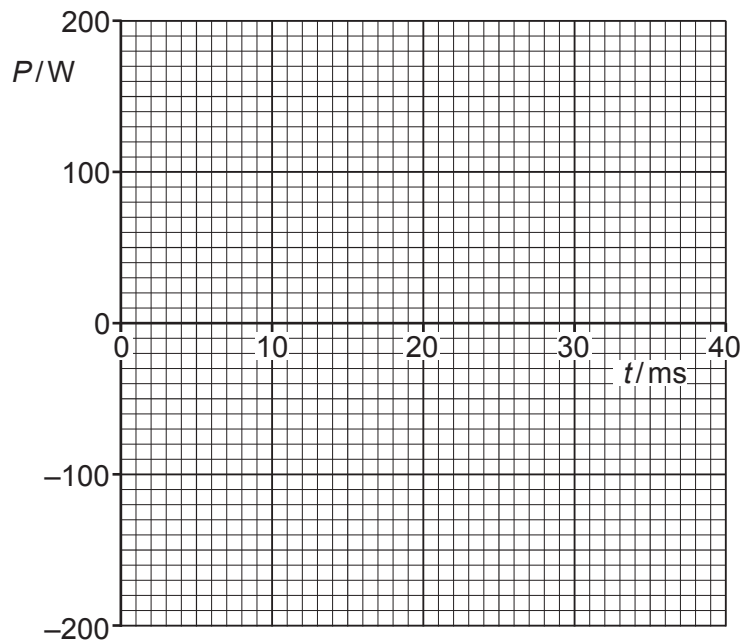
- (i) Calculate the maximum value of  $V_{OUT}$ .

maximum  $V_{OUT} = \dots\dots\dots$  V [1]

- (ii) Calculate the root-mean-square (r.m.s.) current in the load resistor.

r.m.s. current = ..... A [1]

- (iii) On Fig. 10.2, sketch the variation with time  $t$  of the power  $P$  dissipated in the load resistor for time  $t = 0$  to  $t = 40$  ms. Assume that  $P = 0$  when  $t = 0$ .



**Fig. 10.2**

[3]

- (c) Explain, with reference to Fig.10.2, why the mean power in the load resistor is 70W.

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 .....  
 .....  
 ..... [2]