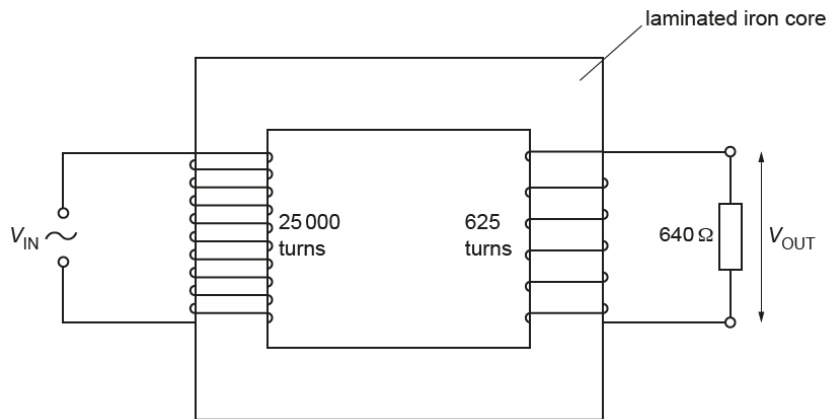


- 5 Fig. 5.1 shows a simple laminated iron core transformer consisting of a primary coil of 25 000 turns and a secondary coil of 625 turns.



**Fig. 5.1**

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

- (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  $V_{OUT}$  = ..... 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. 5.2, 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  $t = 0$ .

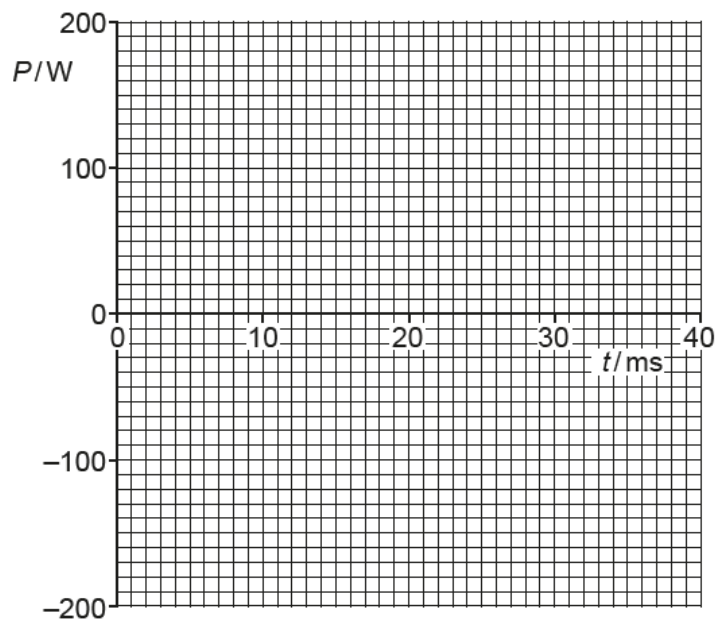


Fig. 5.2

[2]

- (c) Deduce, with reference to Fig. 5.2, the mean power in the load resistor.

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

[Total: 8]