

- 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.

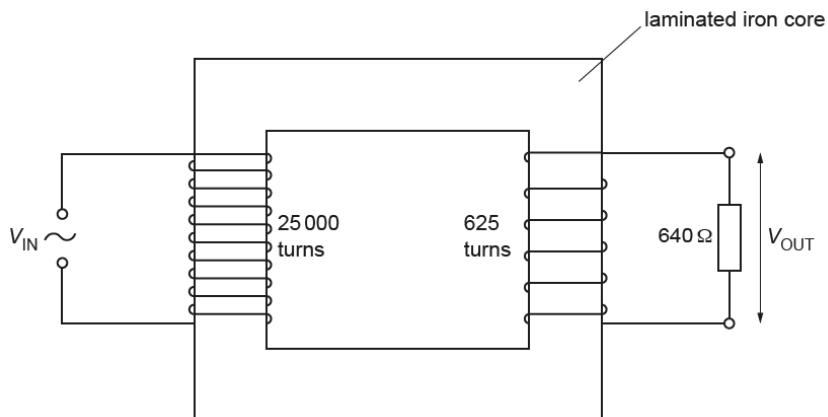


Fig. 5.1

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

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

..... [1]

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

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.....

[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 $V_{\text{OUT}} = \dots \text{V}$ [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 $t = 0$.

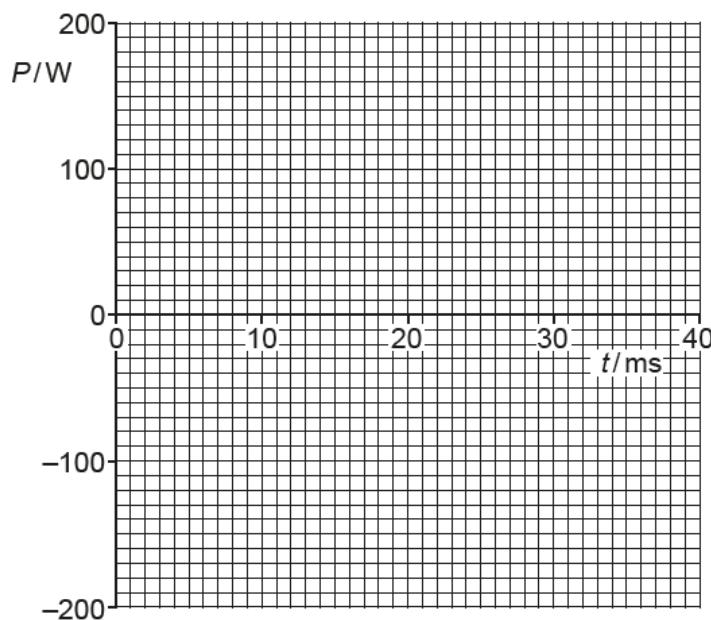


Fig. 5.2

[2]

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

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[1]

[Total: 8]