

- 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.

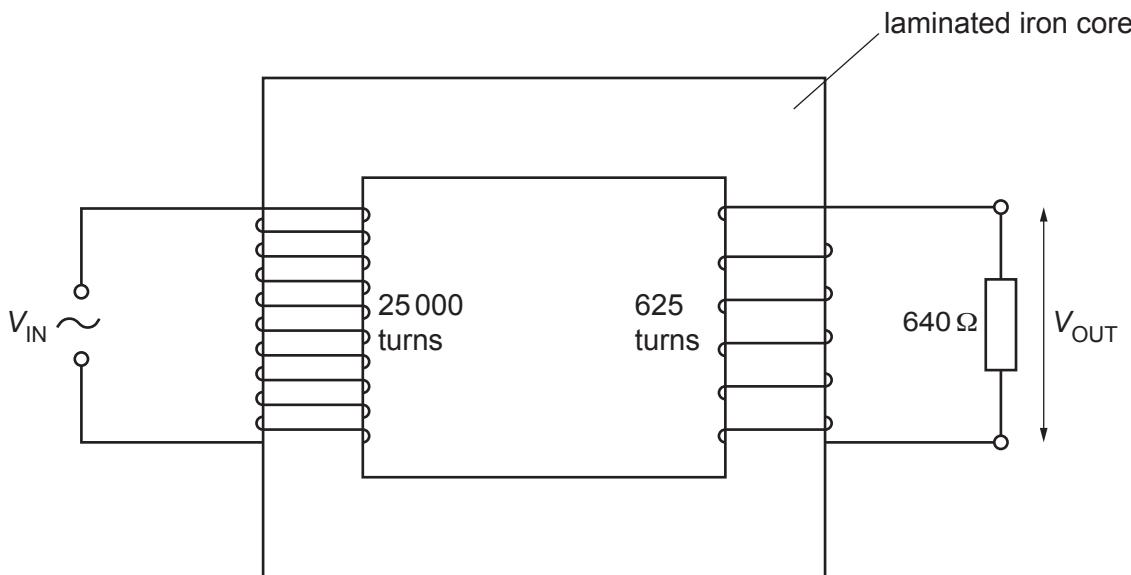


Fig. 10.1

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.

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..... [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} .

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

- (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 $t = 40\text{ ms}$. Assume that $P = 0$ when $t = 0$.

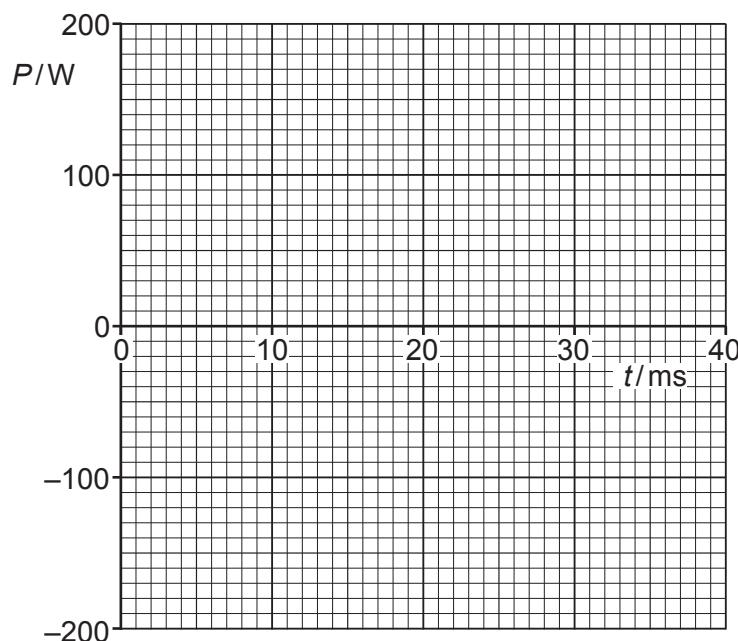


Fig. 10.2

[3]

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

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[2]