

- 6 (a) The variation of an alternating voltage V_P in volts with time t in seconds is given by

$$V_P = 170 \sin (314 t)$$

The alternating voltage V_P is connected to the primary coil of an ideal transformer as shown in Fig. 6.1. An electric heater with resistance 130Ω is connected to the secondary coil of the transformer.

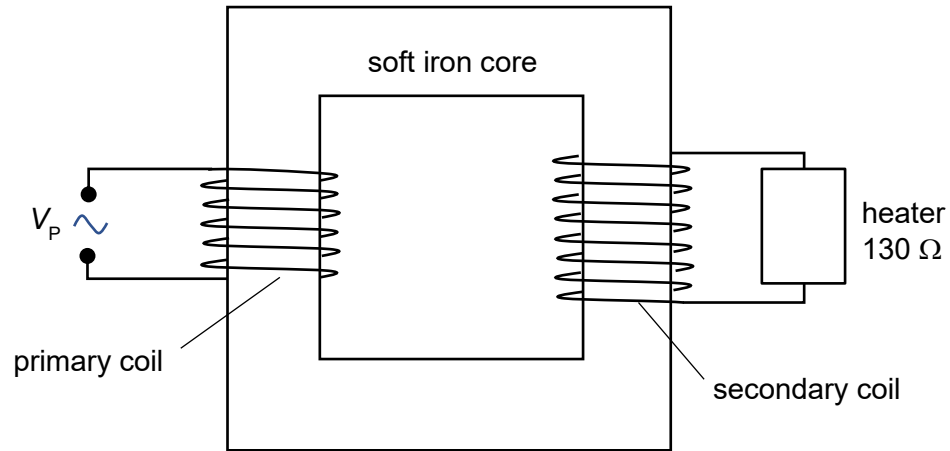


Fig. 6.1

The primary coil consists of 2000 turns and the secondary coil consists of 3500 turns.

- (i) Determine r.m.s. potential difference, $V_{S, \text{r.m.s.}}$ of the secondary coil.

$V_{S, \text{r.m.s.}} = \dots\dots\dots \text{V [2]}$

- (ii) Determine the peak current, $I_{P, \text{peak}}$ in the primary coil.

$$I_{P, \text{ peak}} = \dots\dots\dots \text{ A [3]}$$

- (b)** In Fig. 6.1, the mean power dissipated in the heater is P .

The number of turns in secondary coil is halved while keeping the V_P and the number of turns in primary coil constant.

Determine the new mean power dissipated in the heater in terms of P . Explain your answer.

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..... [2]

[Total: 7]

