

- 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  $130 \Omega$  is connected to the secondary coil of the transformer.

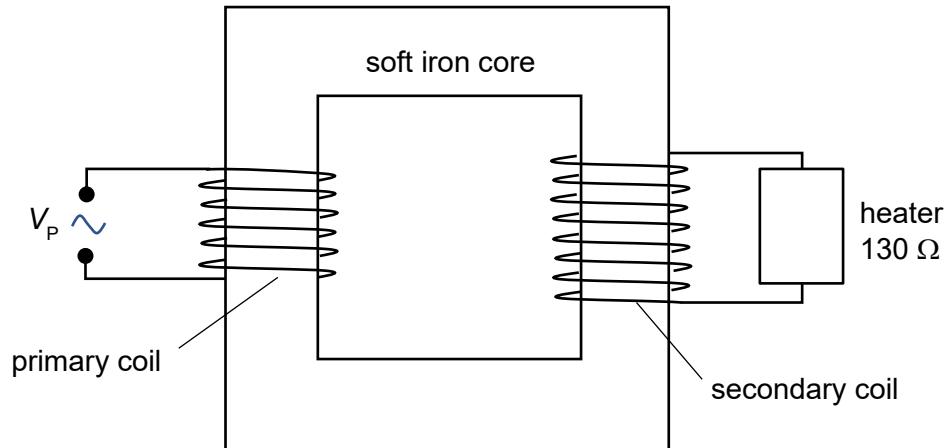


Fig. 6.1

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.

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

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

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

- (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]



