7 The variation with time *t* of the current *I* in a resistor is shown in Fig. 7.1.

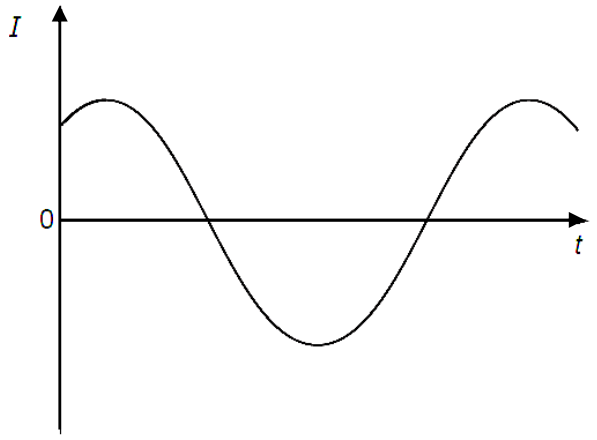

Fig. 7.1

The variation of the current with time is sinusoidal.

(a) **(i)** Explain why, although the mean current is zero, power is dissipated in the resistor.

……

…… [1]

(ii) Using the relation between root-mean-square (r.m.s.) current and peak current, deduce the value of the ratio

$$\frac{\text{average power disspated in the resistor}}{\text{maximum power disspated in the resistor}}$$

ratio = …… [2]

(b) A simple iron-cored transformer is illustrated in Fig. 7.2.

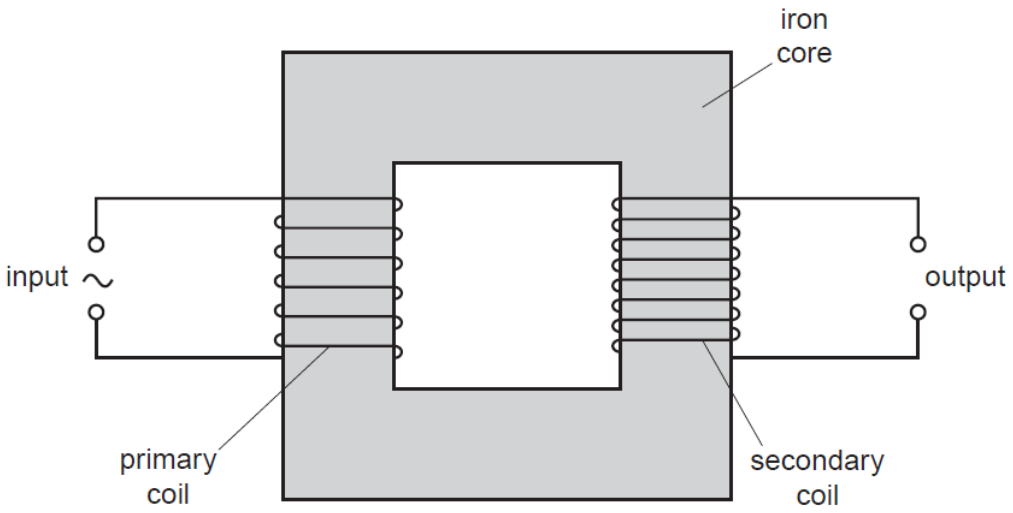

Fig. 7.2

(i) State why the primary and secondary coils are wound on a core made of soft iron.

……

…… [1]

(ii) Explain why thermal energy is generated in the core when the transformer is in use.

……

……

……

…… [2]

(iii) State a typical feature in the design of the iron core to reduce power loss.

…….... [1]

[Total 7]

Section B

Answer **one** question from this Section in the spaces provided.