6 A simple iron-cored transformer is illustrated in Fig. 6.1.

For Examiner's Use

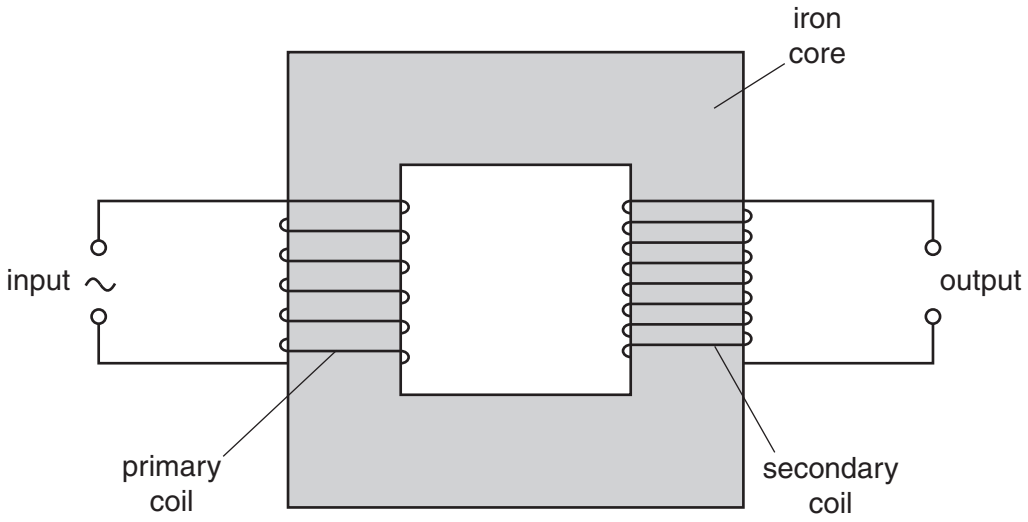

Fig. 6.1

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

.....

.....

.....[1]

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

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.....

.....[3]

(b) The root-mean-square (r.m.s.) voltage and current in the primary coil are V_P and I_P respectively.
The r.m.s. voltage and current in the secondary coil are V_S and I_S respectively.

(i) Explain, by reference to direct current, what is meant by the *root-mean-square* value of an alternating current.

.....

.....

.....[2]

(ii) Show that, for an ideal transformer,

$$\frac{V_S}{V_P} = \frac{I_P}{I_S} .$$

[2]