5 An ideal transformer is shown in Fig. 5.1.

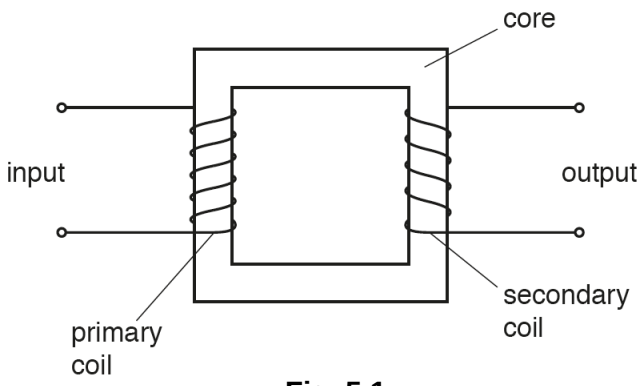

Fig. 5.1

(a) Explain why the core is

(i) made of soft iron,

……

…… [1]

(ii) laminated.

……

…… [1]

(b) Use Faraday's law to explain the operation of the transformer.

……

……

……

……

……

…… [3]

(c) A varying e.m.f. is connected to the input of the transformer and produces a current in the primary coil as shown in Fig 5.2.

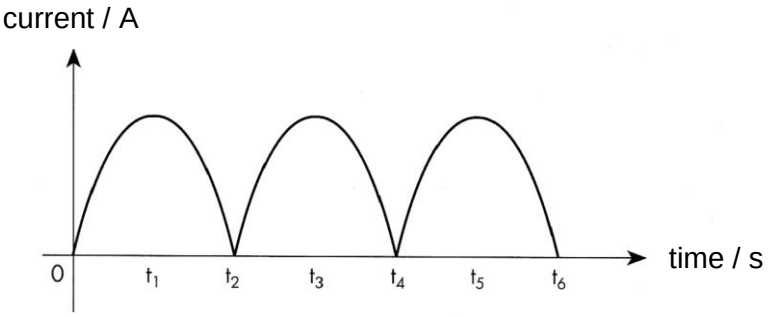

Fig. 5.2

(i) On Fig. 5.3, sketch a graph to show the variation with time of the magnetic flux produced by the current in the primary coil. The graph should extend from $t = 0$ to $t = t_6$.

Fig. 5.3 [1]

(ii) On Fig. 5.4, sketch a graph to show the variation with time of the e.m.f. induced across the secondary coil. The graph should extend from $t = 0$ to $t = t_6$.

Fig. 5.4 [1]

(iii) State and explain how the e.m.f. induced across the secondary coil is affected by

1. the number of turns in the primary coil,

……

……

……

……

…… [2]

2. the number of turns in the secondary coil.

……

……

……

……

…… [2]

[Total: 11]