7 **(a)** A simple generator consists of a coil with one turn that rotates at a constant rate in a uniform field as shown in Fig 7.1.

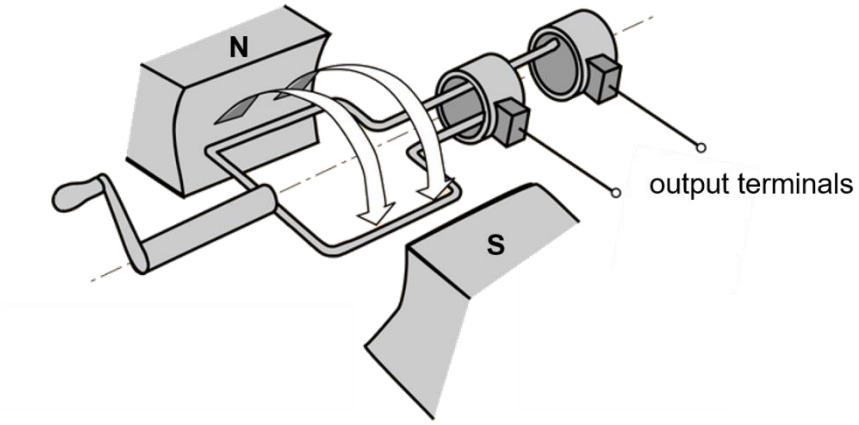

Fig. 7.1

(i) Explain why an e.m.f. is generated when the coil rotates.

.....

.....

[1]

.....

(ii) The variation with time t of magnetic flux linkage Φ of the coil is shown in Fig 7.2. On the axes provided in Fig 7.2, sketch the variation with time of the induced e.m.f. E.

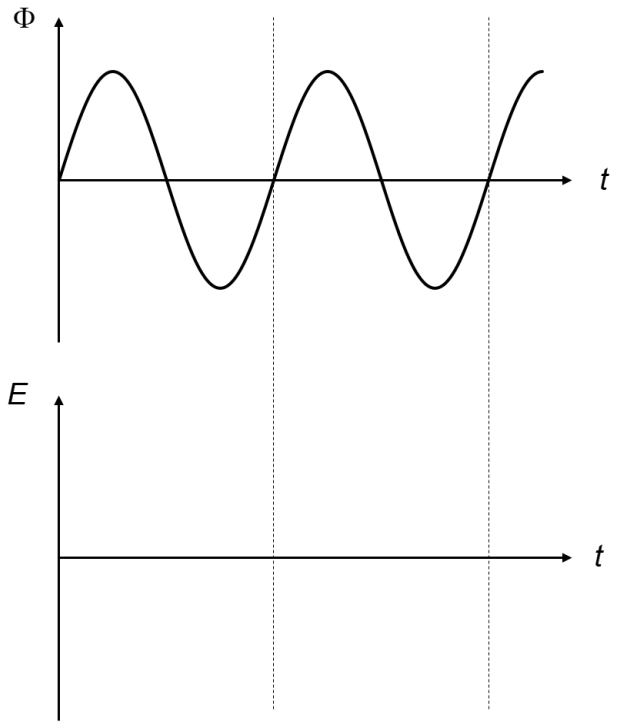

Fig 7.2

[1]

(b) The output from a similar generator is connected to the input of a transformer. The transformer has 12 turns on its primary coil and 600 turns on its secondary coil. The transformer may be considered to be ideal. The input e.m.f. is 2.3 kV root-mean-square.

(i) Explain what is meant by the *root-mean-square value* of an alternating voltage.

.....

[2]

(ii) Determine the root-mean-square value of the induced e.m.f. across the secondary coil.

induced e.m.f. = ... V [2]

(iii) Explain the advantage of stepping up the voltage before transmission.

.....

.....

[1]

End of Paper 3 Section A

Section B

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