6 (a) A coil with 500 turns is placed in a uniform magnetic field of flux density 5.0×10^{-2} T. The area of the coil perpendicular to the field is 2.5×10^{-2} m^2, as shown in Fig. 6.1.

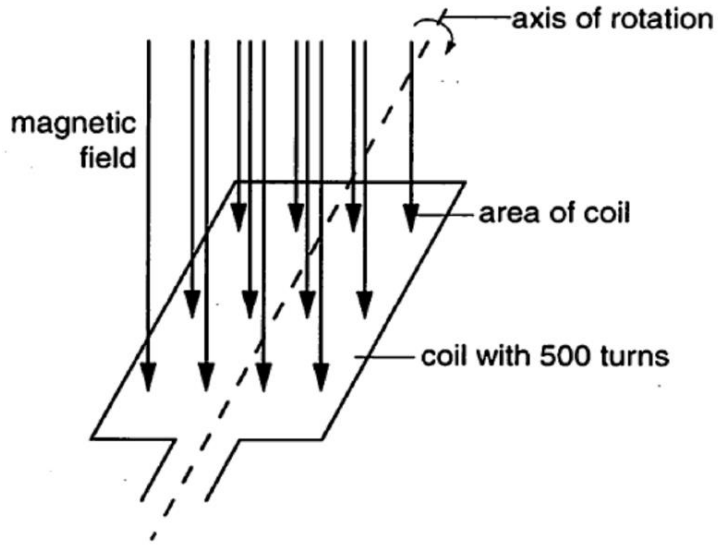

Fig. 6.1

Calculate the magnetic flux linkage of the coil. Give an appropriate unit.

magnetic flux linkage = …… unit: …… [1]

(b) The coil in **(a)** is rotated at a constant angular velocity about the axis in Fig. 6.1. The flux linkage Φ of the coil varies with time t, as shown in Fig. 6.2.

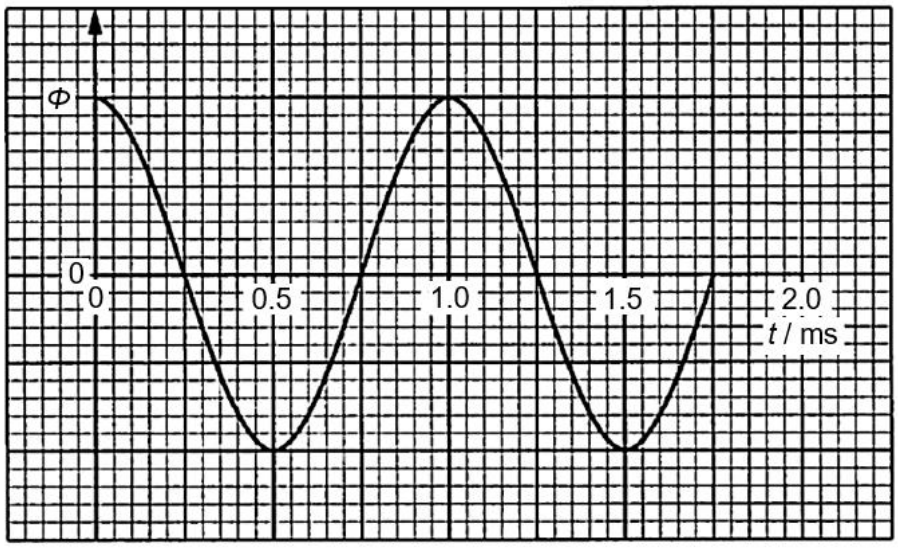

Fig. 6.2

(i) Calculate the maximum induced electromotive force (e.m.f.).

maximum induced e.m.f. = ……V [2]

(ii) Calculate the root-mean-square value of the induced e.m.f.

root-mean-square e.m.f. = ……V [1]

(iii) Explain why the flux linkage changes *sinusoidally* as the coil is rotated.

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.... [1]
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