6 **(a)** Define *magnetic flux density*.

.....

.....

.....

..... [3]

(b) A flat coil consists of N turns of wire and has area A. The coil is placed so that its plane is at an angle θ to a uniform magnetic field of flux density B, as shown in Fig. 6.1.

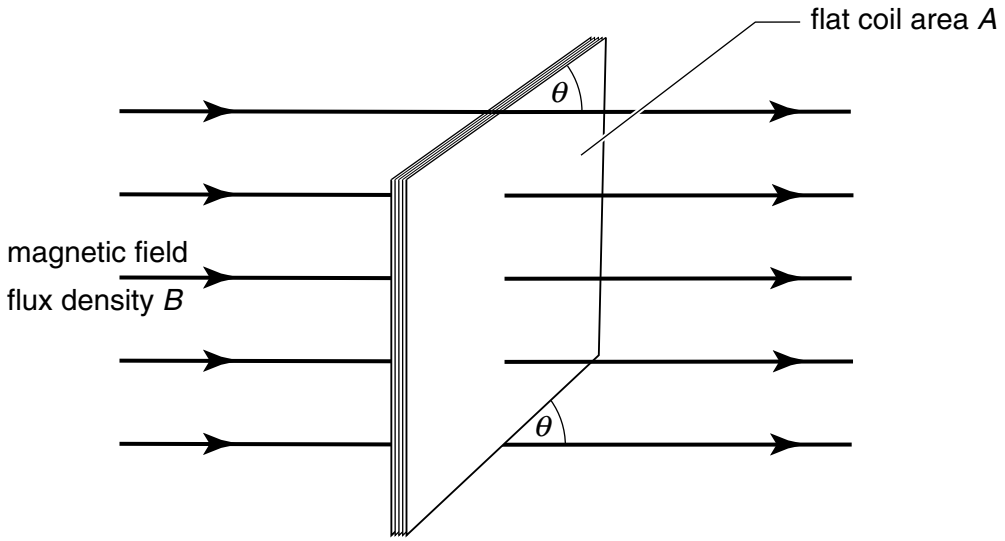

Fig. 6.1

Using the symbols A, B, N and θ and making reference to the magnetic flux in the coil, derive an expression for the magnetic flux linkage through the coil.

[2]

(c) (i) State Faraday's law of electromagnetic induction.

.....

.....

..... [2]

(ii) The magnetic flux density B in the coil is now made to vary with time t as shown in Fig. 6.2.

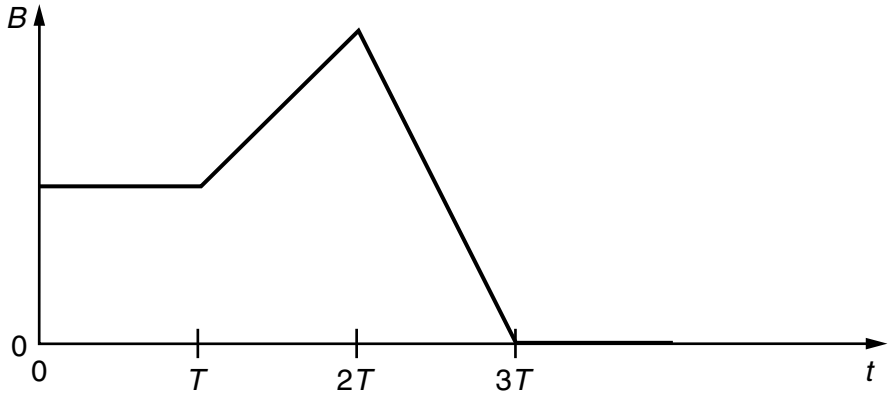

Fig. 6.2

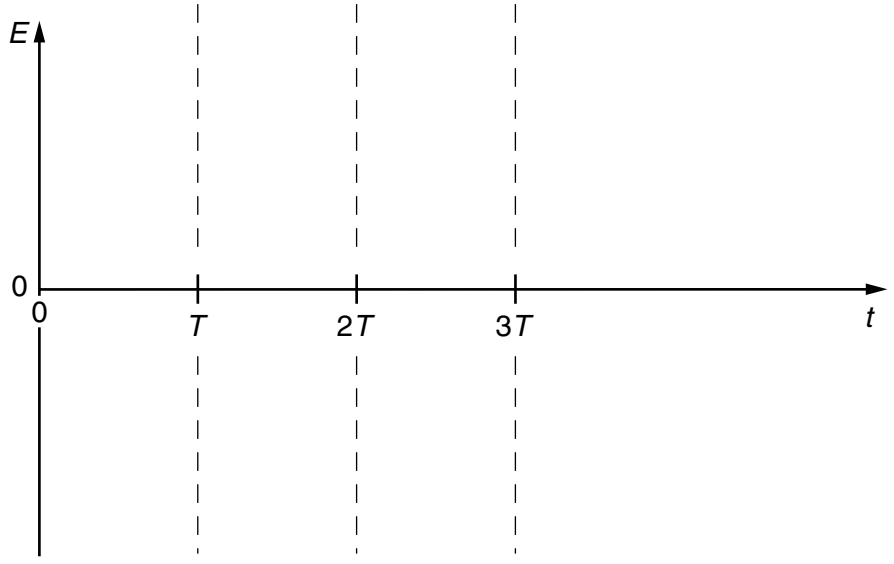

Fig. 6.3

On Fig. 6.3, sketch the variation with time t of the e.m.f. E induced in the coil. [3]