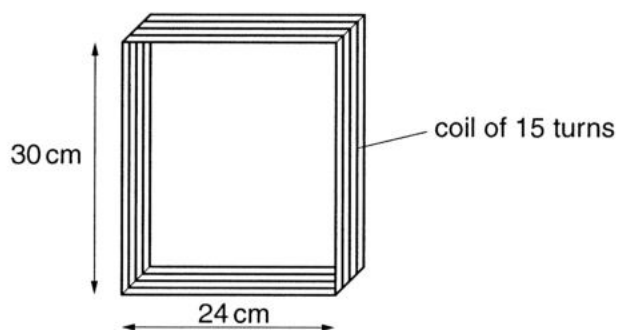**6** Fig. 6.1 shows a rectangular coil.



**Fig. 6.1**

**(a)** The coil has dimensions 30 cm by 24 cm and has 15 turns.
A uniform magnetic field of flux density 0.018 T is at right-angles to the plane of the coil.
Show that the magnetic flux linkage of the coil is 0.019 Wb turns.

[1]

**(b)** The uniform magnetic field in **(a)** is kept constant for 2.0 s and then reduced to zero over a time of 4.0 s, as shown in Fig. 6.2.
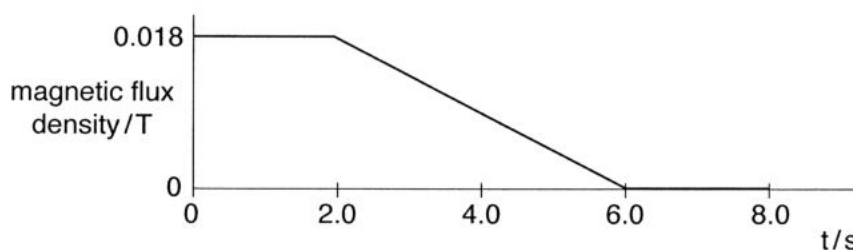


**Fig. 6.2**

**(i)** Explain why an e.m.f. is induced in the coil.

.................................................................................................................................

................................................................................................................................. [1]

**(ii)** Calculate the magnitude of the induced e.m.f.

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

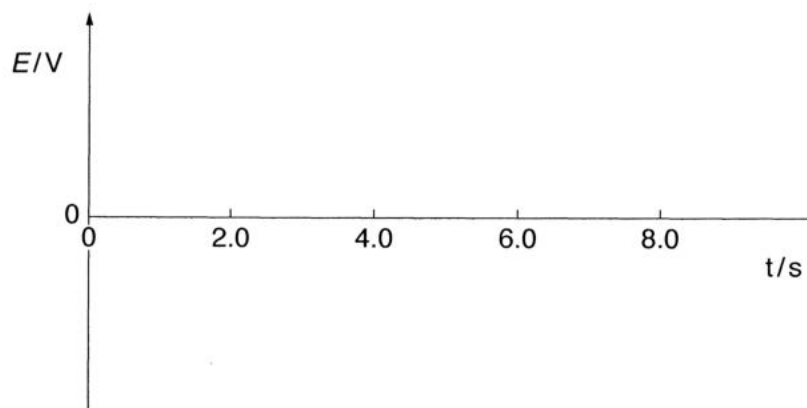**(iii)** On Fig. 6.3, sketch a graph to show the variation with time of the e.m.f. *E* induced in the coil.



**Fig. 6.3**

[2]