9 **(a)** A small coil is placed close to one end of a solenoid connected to a power supply. The plane of the small coil is normal to the axis of the solenoid, as illustrated in Fig. 9.1.

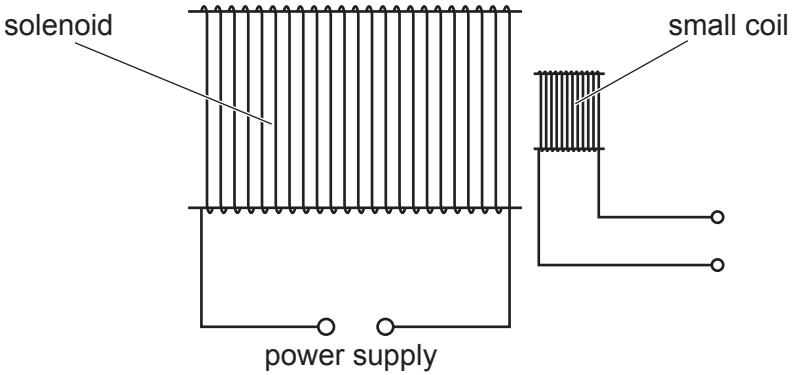

Fig. 9.1

The power supply causes the current I in the solenoid to vary with time t as shown in Fig. 9.2.

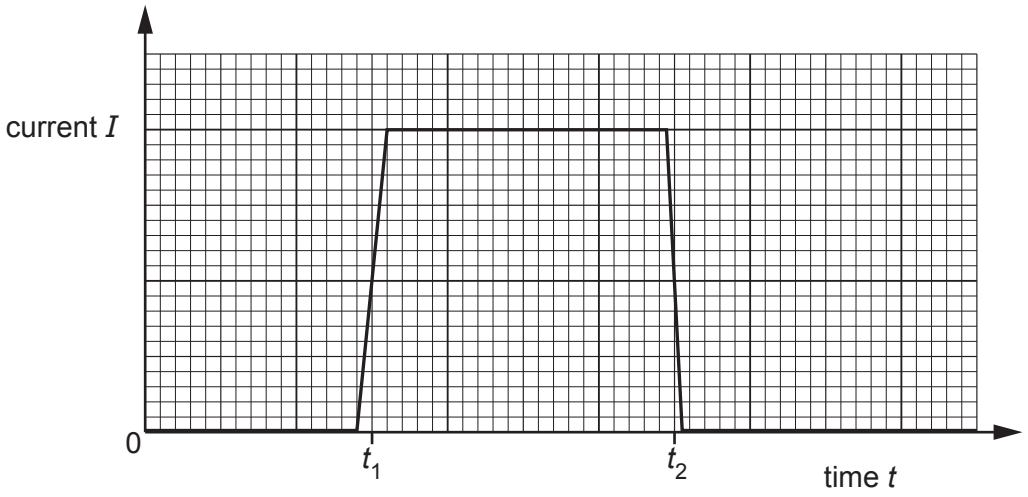

Fig. 9.2

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

.....

.....

..... [2]

(ii) On the axes of Fig. 9.3, sketch a graph to show the variation with time t of the electromotive force (e.m.f.) induced in the small coil.

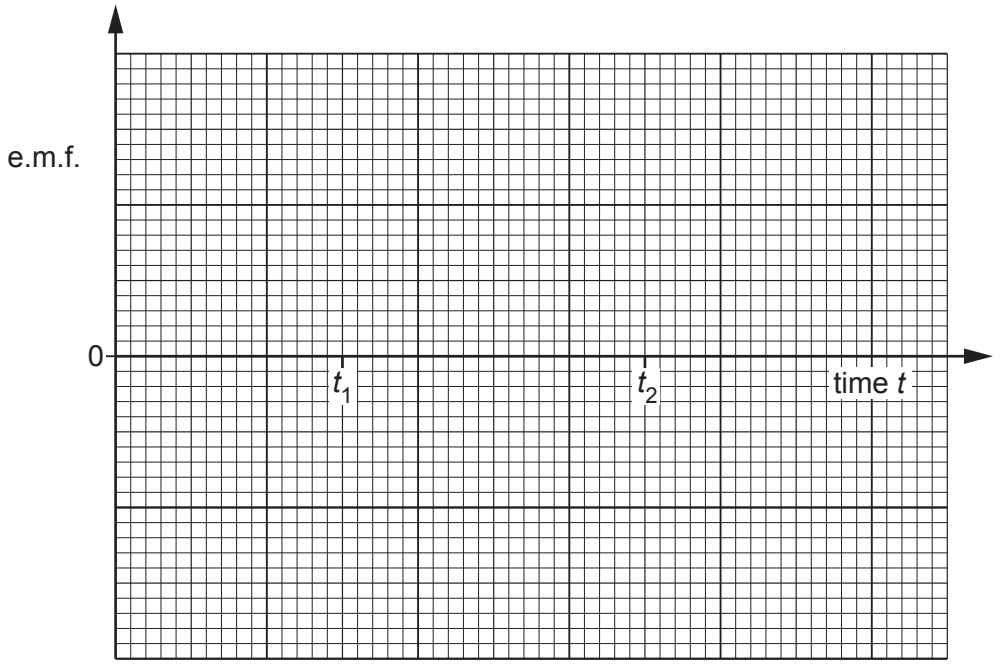

Fig. 9.3

[4]

(b) The small coil in **(a)** is now replaced by a Hall probe.

The Hall probe is positioned so that the reading for the probe is a maximum.

The current I in the solenoid varies again as shown in Fig. 9.2.

On the axes of Fig. 9.4, sketch a graph to show the variation with time t of the reading V_H of the probe.

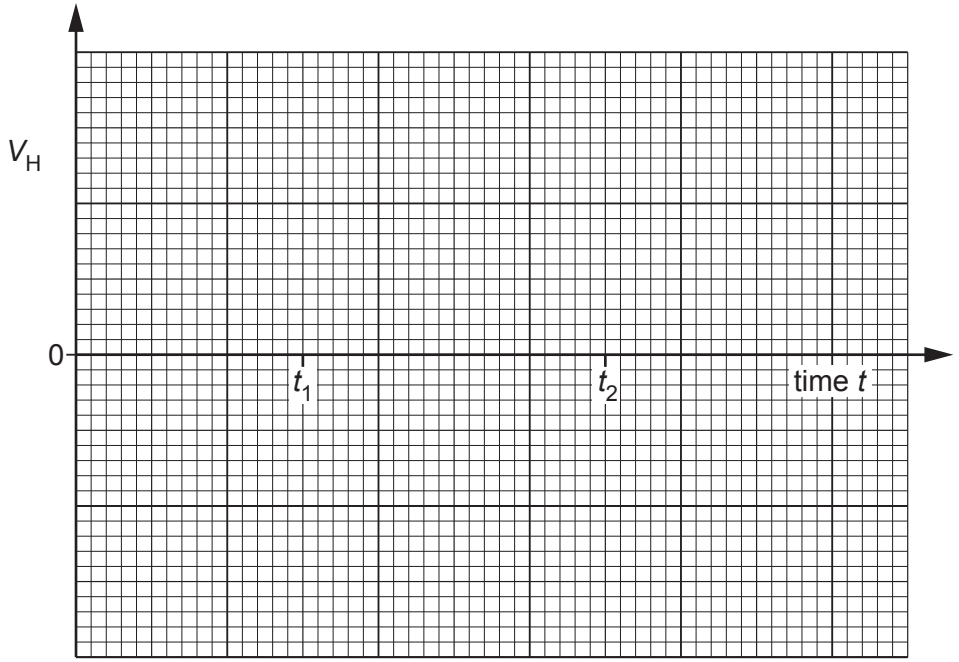

Fig. 9.4

[2]

[Total: 9]