5 **(a)** State Faraday's law of electromagnetic induction.

.....

..... [1]

(b) A solenoid of length 15 cm, cross-sectional area 2.5×10^{-4} m^2, and 3000 turns is placed in the middle of a coil of 1500 turns as shown in Fig. 5.1. The solenoid is connected to a battery, a rheostat and an ammeter. The coil is connected to a galvanometer.

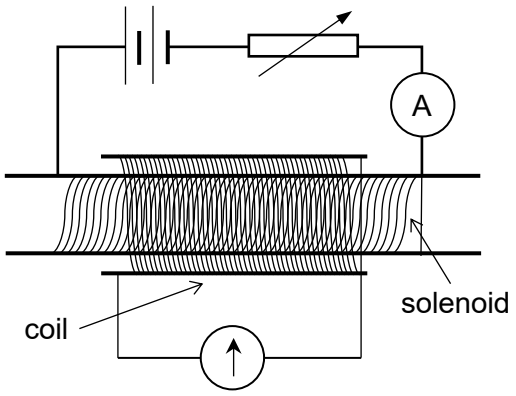

Fig. 5.1

Fig. 5.2 shows the variation with time t of the current I through the solenoid as the resistance of the rheostat is varied.

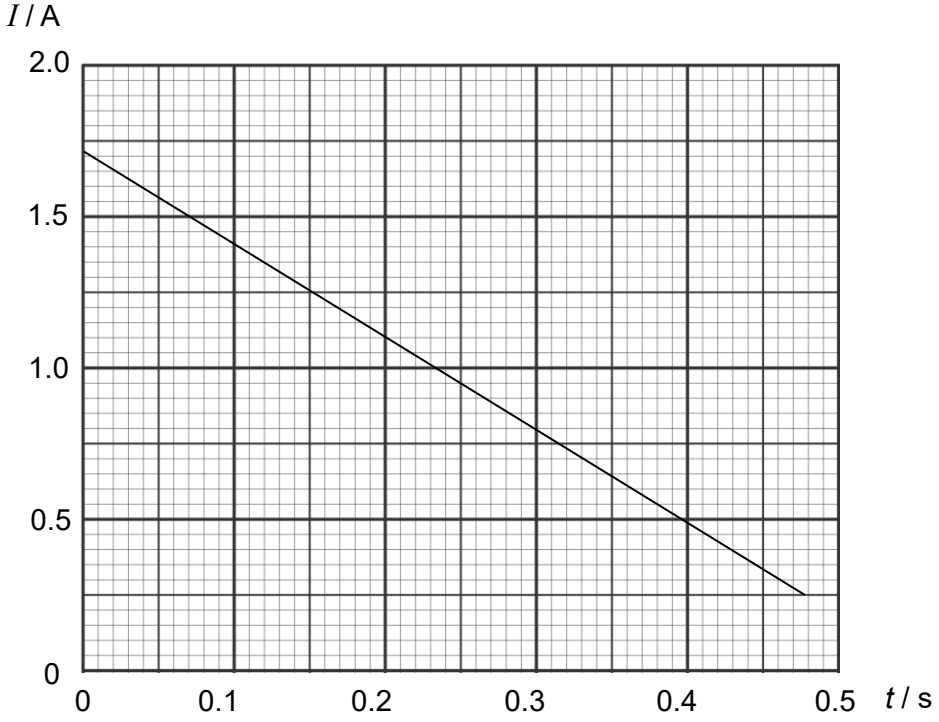

Fig. 5.2

(i) Calculate the magnetic flux density produced in the solenoid at t = 0.070 s.

magnetic flux density = ... T [3]

(ii) Calculate the e.m.f. induced in the coil.

e.m.f. = ... V [3]

(iii) State and explain the direction of the current through the galvanometer.

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..... [3]