6 **(a)** A coil of wire consisting of two loops is suspended from a fixed point as shown in Fig. 6.1.

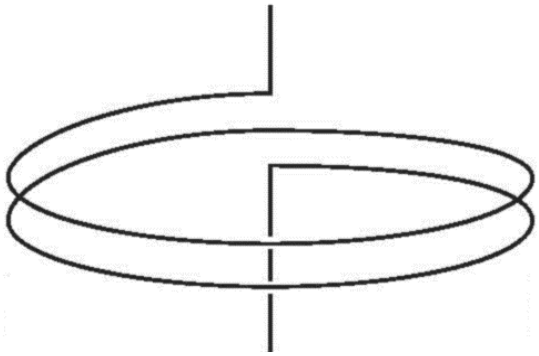

Fig. 6.1

The coil is connected into a circuit such that the lower end of the coil is free to move.

Explain why, when a current is switched on in the coil, the separation of the loops of the coil decreases.

……..

……..

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……..

……..... [2]

(b) Fig. 6.2 shows a current balance in which a frame ABCD rests on conducting pivots. Arm AB is placed between a pair of strong magnets.

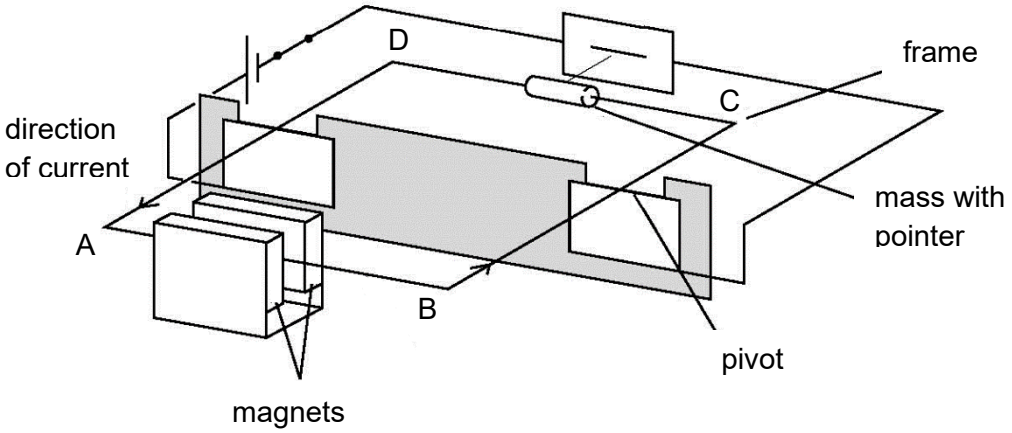

Fig. 6.2

When there is current of 4.5 A in arm AB of the frame, a mass must be added to arm CD to restore balance.

(i) State and explain the direction in which the magnetic force must be acting on the arm AB.

……

……

……

…… [2]

(ii) Arm AB has a length of 4.6 cm inside the uniform magnetic field. The magnetic force acting on arm AB is 24 mN.

Calculate the magnetic flux density of the uniform magnetic field.

magnetic flux density = …… T [2]

[Total: 6]