

- 5 A long straight wire carries a steady direct current. A circular loop of conducting wire is placed directly below the straight wire such that the wire is in the plane of the loop.

The loop falls vertically due to gravity from the wire as shown in Fig. 5.1.

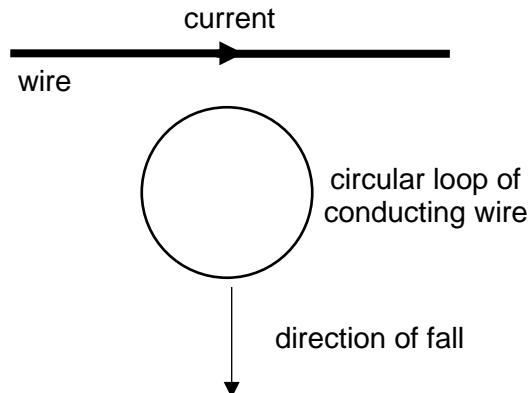


Fig 5.1

- (a) (i) Explain why an e.m.f. is induced in the loop.

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[2]

- (ii) Determine and explain the direction of induced current in (i).

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[3]

- (b) The circular loop has a radius of 5.0 cm, The magnetic flux density within the loop decreases from 120 mT to 30 mT in 0.040 s.

Show the magnitude of the average e.m.f. induced in the loop during this time is 18 mV.

[1]

[Total: 6 m]