Part I

1. A straight horizontal wire carries a conventional current of 5.0 A from west to east in a region where there is a magnetic field of 2.0 directed vertically down into the earth. The force per unit length on the wire is

    (a) 2.5 N directed south

    (b) 10 N directed north

    (c) 10 N directed south

    (d) 10 N directed vertically into the earth.

    Answer (b)

2. An alpha particle has four time the mass and twice the charge of a proton. Both particles move perpendicular to a uniform magnetic field with the same speed. The ratio of the magnetic force on the proton to the magnetic force on the alpha particle is

    (a) 1:1

    (b) 1:2

    (c) 2:1

    (d) 1:4

    Answer (b).

3. A charged particle enters a uniform magnetic field. If the angle between the velocity and field is not 90^0 the path of the particle will be

    (a) circular.

    (b) elliptical.

    (c) parabolic.

    (d) helical.

    Answer (d).

4. A current carrying loop in a uniform magnetic field always tends to rotate until the plane of the loop is

    (a) parallel to the field.

    (b) perpendicular to the field.

    (c) at a 45° angle to the field.

    (d) it will not tend to rotate since the net force is zero.

    Answer (b).