

UNIT III

MAGNETIC EFFECT OF CURRENT AND MAGNETISM

- 1) State the Biot Savart law for the magnetic field due to a current carrying element. Use this law to obtain the formula for magnetic field at the center of circular loop of radius R carrying a steady current i . Indicate the direction of magnetic field.
- 2) Using Biot Savart law derive the expression for the magnetic field due to a current carrying circular loop of radius a at point which is at distance R from its center along the axis of loop.
- 3) State Ampere's circuital law. Using this law derive the formula for infinitely long straight current carrying conductor/toroid.
- 4) Find the relation for the interaction between two straight infinitely long parallel current carrying conductors. Describe the direction of force between the conductors
 - (I) For same direction of current and
 - (II) For opposite direction of current.
- 5) Explain with the help of a labelled diagram, the principle & construction of a Cyclotron. Deduce an expression for the cyclotron frequency and what is resonance condition? How is it used to accelerate the charged particles?
- 6) With the help of a neat and labelled diagram explain the underlying principle, construction of a moving coil galvanometer. How can we increase the sensitivity of a galvanometer?
- 7) A galvanometer having a coil of resistance 12ohm shows full scale deflection for a current of 2.5mA . How will you convert the meter in to an ammeter of range $0-7.5\text{A}$ and a voltmeter of range $0-10\text{V}$? Determine the net resistance of the meter in each case.
- 8) Derive an expression for the torque on a magnetic dipole placed in a magnetic field and hence define magnetic dipole moment.
- 9) Distinguish between dia ,para and ferro magnetic substances.
- 10) Name and define the magnetic elements of earth's magnetic field at a place.
Deduce various relations between them.
