REGIONAL COACHING CENTRE

Unit Test(Physics)

Time: 1.5 Hr | Class XII | Max Marks: 30

1. (4 points) A circular coil of wire consisting of 100 turns, each of radius 8.0 cm carries a current of 4.0 A. What is the magnitude of the magnetic field B at the coil.

2. (4 points) What is the magnitude of magnetic force per unit length on a wire carrying a current of 8 A and making an angle of 30^0 with the direction of a uniform magnetic field of 0.15 T ?

3. (4 points) A 3.0 cm wire carrying a current of 10 A is placed inside a solenoid perpendicular to its axis. The magnetic field inside the solenoid is given to be 0.27 T. What is the magnetic force on the wire?

4. (4 points) Two long and parallel straight wires A and B carrying currents of 8.0 A and 5.0 A in the same direction separated by a distance of 4.0 cm. Estimate the force on a 10 cm section of wire A.

5. ($3\times4 = 12$ points) Answer any three any three of the following.
   (a) Derive an expression for the torque acting on a current carrying loop placed in the uniform magnetic field.
   (b) Describe the principle and construction of a moving coil galvanometer. Prove that current flowing in the coil is directly proportional to its deflection. What is the importance of the radial field?
   (c) With the help of the diagram, explain principle and working of a cyclotron. Show that cyclotron frequency doesn't depend on the speed of the particles.
   (d) Using ampere's circuital law, obtain an expression for the magnetic field due to a long solenoid at a point inside the solenoid on its axis.

6. (2 points) A deutron of kinetic energy 50 keV is describing a circular orbit of radius 0.5 m in a plane perpendicular to magnetic field $\vec{B}$. The kinetic energy of the proton that describes a circular orbit of radius 0.5 m in the same plane with the same $\vec{B}is$
   (i) 25 keV (ii) 50 keV
   (iii) 200 keV (iv) 100 keV (CBSE PMT)