# Topic- Magnetic Effect of Current

## Assignment-7          Subject-Physics          Class-XII

1. State limitations of a cyclotron. **2**

2. Find the magnetic induction at a distance of 3 cm from a long straight wire carrying a current of 5 A. **2**

3. A proton is accelerated in a cyclotron in which the magnetic induction $0.6$ $Wb/m^2$. Find the cyclotron frequency. **2**

4. A flat circular coil of radius 8 cm and 15 turns carries a current of 4 A. Determine the magnetic induction at the centre of the coil. **3**

5. Calculate the magnitude of the magnetic induction due to a circular coil of 400 turns and radius 0.05 m, carrying a current of 5 A, at a point on the axis of the coil at a distance 0.1 m. **3**

6. State and explain Biot-Savart's law. Derive an expression for the magnetic induction at the centre of a circular coil carrying current. **5**

7. A current I flowing through the sides of an equilateral triangle of side a. The magnitude of the magnetic field at the centroid of the triangle is? **3**

8. In a cyclotron, magnetic field of $3.5$ $Wb/m^2$ is used to accelerate protons. What should be the time interval in which the electric field between the Dee's be reversed? **3**

9. A circular coil A of radius r carries current I. Another circular coil B of radius 2r carries current of I. The magnetic fields at the centres of the circular coils are in the ratio of? **3**

10. Derive expression for the magnetic induction at a point near an infinitely long straight conductor carrying an electric current on the basis of Ampere's law. **3**

11. Two circular coils have radii in ratio 3:4 and the ratio of number of turns is 2: 3. The ratio of currents through coils is 1:4. Find the ratio of magnetic induction at their centres. **3**

12. Explain the principle, construction and working of cyclotron. **5**

13. Derive an expression for a velocity of a charged particle in a cyclotron. Hence, show that velocity of charged particle in a cyclotron varies directly with the radius of circular path. **3**

14. Derive an expression for force experienced by a current carrying conductor placed in uniform magnetic field. Discuss when will be the force maximum and minimum. **3**

15. Derive an expression for magnetic induction at a point on the axis of a circular coil carrying current. **3**