REVISION TEST -10   **Total Marks -30**

12th Physics – Moving Charges and Magnetism

Multiple Choice Questions   5x1 =5

1. Which of the following is most general characteristic of Magnetic field

   a. The magnetic field exerts a force $\vec{F}$ on any other particle

   b. The magnetic field exerts a force $\vec{F}$ only on any iron filings

   c. The magnetic field exerts a force $\vec{F}$ on any other moving charge or current that is present in the field.

   d. The magnetic field exerts a force $\vec{F}$ only on any magnets present in the field.

2. The resistance of the coil of ammeter is R. The shunt resistance required to increase its range four fold should have a resistance:

   a. $\dfrac{R}{3}$

   b. $\dfrac{R}{5}$

   c. $\dfrac{R}{4}$

   d. 4 R

3. A wire of length L is bent to form a ring of single loop and current is flown through it. The magnetic field at its centre is B. If the same wire is bent to form 2 loops and same current is flowing, the new B' at its centre will be

   a. B

   b. $\dfrac{B}{2}$

   c. 4B

   d. 2B

4. An infinitely long straight conductor is bent into the shape as shown in fig. The magnetic induction at the centre of circular loop is

   a. ∞

   b. $\dfrac{\mu_o i}{2\pi r}\left(\pi - 1\right)$

   c. $\dfrac{\mu_o i}{2\pi r}\left(\pi + 1\right)$
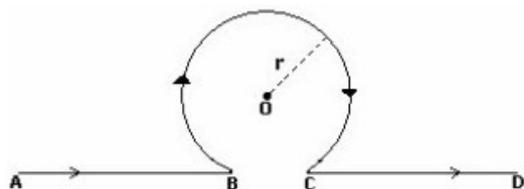
   d. zero

5. A galvanometer of resistance 25Ω is shunted by a 2.5Ω wire. The part of total current that flows through the galvanometer is given by:

   a. $\frac{I}{I_0} = \frac{2}{11}$

   b. $\frac{I}{I_0} = \frac{4}{11}$

   c. $\frac{I}{I_0} = \frac{1}{11}$

   d. $\frac{I}{I_0} = \frac{3}{11}$

Short Type 1 Questions   4 x2 =8

6. What is the direction of the force acting on a charged particle q, moving with a velocity $\vec{v}$ in a uniform magnetic field $\vec{B}$?

7. A magnetic dipole is situated in the direction of a magnetic field. What is its potential energy? If it is rotated by 180°, then what amount of work will be done?

8. Write the SI unit of (i) magnetic pole strength (ii) magnetic dipole moment of a bar magnet.

9. A 50 turn coil as shown in the figure below carries of 2 A in a magnetic field B = 0.25 Wb m^{-2}. Find the torque acting on the coil. In what direction will it rotate?
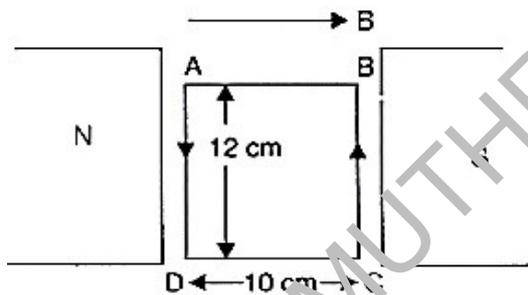
Short Type 2 Questions   3 x3 =9

10. What is a shunt? State its SI unit.

11. A dielectric slab of thickness 't' is kept in between the plates, each of area 'A', of a parallel plate capacitor, separated by a distance 'd'. Derive an expression for the capacitance of this capacitor for t < < d.

12. A long straight wire in the horizontal plane carries a current of 50 A in north to south direction. Give the magnitude and direction of B at a point 2.5 m east of the wire.

Long Type Questions   2 x4 =8

13. What is the toroid? Using Ampere's circuital law calculate the magnetic field inside the toroid.

14. Derive an expression for the maximum force experienced by a straight conductor of length l, carrying current I and kept in a uniform magnetic field B.