

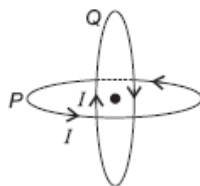


**Adhikaansh Academy**  
**Revision Test -08**  
**Physics: Moving Charge & Magnetism**  
**Class : XII**

Roll No. :  
Date : 22.07.23

Time - 1 hr  
MM - 25

1. A current carrying loop is free to turn in a uniform magnetic field  $B$ . Under what conditions, will the torque acting on it be (i) minimum and (ii) maximum? 1
2. Write two factors by which voltage sensitivity of a galvanometer can be increased. 1
3. An ammeter and a milliammeter are converted from the same galvanometer. Out of the two, which current measuring instrument has higher resistance? 1
4. What is the advantage of using radial magnetic field in a moving coil galvanometer? 1
5. Under what conditions will the force exerted by the magnetic field on a charged particle be (i) maximum and (ii) minimum? 1
6. Which one of the following will experience maximum force, when projected with the same velocity ' $v$ ' perpendicular to the magnetic field ' $B$ ': (i)  $\alpha$ -particle, and (ii)  $\beta$ -particle? 1
7. Two identical circular wires P and Q each of radius  $R$  and carrying current  $I$  are kept in perpendicular planes such that they have a common centre as shown in the figure. Find the magnitude and direction of the net magnetic field at the common centre of the two coils. 2



8. How is a moving coil galvanometer converted into a voltmeter? Explain, giving the necessary circuit diagram and the required mathematical relation used. 2
9. Define the current sensitivity of a moving coil galvanometer. "Increasing the current sensitivity may not necessarily increase the voltage sensitivity." Justify this statement. 2
10. (a) Using Biot–Savart's law, derive the expression for the magnetic field in the vector form at a point on the axis of a circular current loop. 5  
(b) What does a toroid consist of? Find out the expression for the magnetic field inside a toroid for  $N$  turns of the coil having the average radius  $r$  and carrying a current  $I$ . Show that the magnetic field in the open space inside and exterior to the tortoid is zero.
11. (a) Derive the expression for the torque on a rectangular current carrying loop suspended in a uniform magnetic field. 5  
(b) A proton and a deuteron having equal momenta enter in a region of uniform magnetic field at right angle to the direction of the field. Depict their trajectories in the field.
12. A circular coil of radius 4 cm and of 20 turns carries a current of 3 amperes. It is placed in a magnetic field of intensity of  $0.5 \text{ weber/m}^2$ . The magnetic dipole moment of the coil is 1  
(a)  $0.15 \text{ ampere-m}^2$  (b)  $0.3 \text{ ampere-m}^2$

(c) 0.45 ampere-m<sup>2</sup> (d) 0.6 ampere-m<sup>2</sup>

13. The maximum current that can be measured by a galvanometer of resistance 40  $\Omega$  is 10 mA. It is converted into voltmeter that can read upto 50 V. The resistance to be connected in the series with the galvanometer is

- (a) 2010  $\Omega$  (b) 4050  $\Omega$   
(c) 5040  $\Omega$  (d) 4960  $\Omega$

14. In a circular coil of radius  $r$ , the magnetic field at the centre is proportional to

1

(a)  $r^2$

(b)  $r$

(c)  $\frac{1}{r}$

(d)  $\frac{1}{r^2}$