INDIAN SCHOOL DARSAIT
DEPARTMENT OF PHYSICS

Subject : PHYSICS	Topic : MOVING CHARGES & MAGNETISM	Date of Worksheet : 6.6.17 Worksheet # 5
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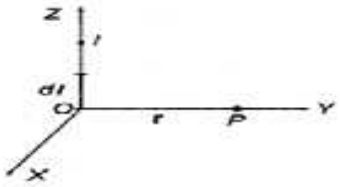
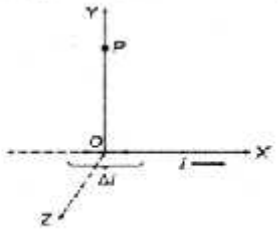
Name of the Student :_____	Class & Division : _____	Roll Number : __

1.	Draw the magnetic field lines due to a current carrying loop (**2013**)
2.	Why should the spring/suspension wire in a moving coil galvanometer have low torsional constant? (**2008**)
3.	Write two factors by which current sensitivity of a moving coil galvanometer can be increased. (**2008**)
4.	A rectangular coil of sides l and b carrying a current I is subjected to a uniform magnetic field B acting perpendicular to its plane. Obtain the expression for the torque acting on it. (**2014**)
5.	Define one tesla using the expression for the magnetic force acting on a particle of charge q moving with velocity v in a magnetic field B (**2014**)
6.	A circular coil of closely wound N turns and radius r carries a current I. write the expressions for the following: (i) Magnetic field at its centre. (ii) Magnetic moment of this coil. (**2012**) (iii)
7.	A particle of charge q and mass m is moving with velocity. It is subjected to a uniform magnetic field B directed perpendicular to its velocity. Show that it describes a circular path. Write the expression for its radius. (**2012**)
8.	A straight wire of length L is bent into a semicircular loop. Use Biot- Savart's law to deduce an expression for the magnetic field at its centre due to current passing through it. (**2012**)
9.	State Ampere's circuital law. Show through an example; how this law enables an easy evaluation of the magnetic field when there is symmetry in the system? (**2010)**
10.	A current I flows in a conductor placed perpendicular to the plane of the paper. Indicate the direction of the magnetic field due to a small element dl at a point P situated at a distance r from the element as shown in the figure:



11. An element $\Delta l = \Delta x \hat{l}$ is placed at the origin (as shown in figure) and carries a current $I = 2$ A. Find out the magnetic field at a point P on the Y-axis at a distance of 1.0 m due to the element $\Delta x = w$ cm. Also, give the direction of the field produced. **[Delhi 2009C]**



A long straight wire of a circular cross-section of radius a carries a steady current I. The current is uniformly distributed across the cross-section. Apply Ampere's circuital law to calculate the magnetic field at a point in the region for (*i*) $r < a$ and (*ii*) $r > a$. **[Delhi 2010]**

12. A solenoid of length1m has a radius of 1cm and has a total of 1000turns wound on it. It carries a current of 5A. Calculate the magnitude of the axial magnetic field inside the solenoid. If an electron was to move with a speed of 10^4m/s along the axis of this current carrying solenoid, what would be the force experienced by this electron? (**2008**)

13. A long straight wire of a circular cross section of radius a carries a steady current I. The current is uniformly distributed across the cross-section of the wire. Use Ampere's circuital law to show that the magnetic field due to this wire in the region inside increases with distance. Write the value of this field on the surface of the wire. (**2008**)

14. A coil of N turns and radius R carries a current I. It is unwound and rewound to make a square coil of side **a** having same number of turns N. Keeping the current I same, find the ratio of magnetic moments of the square coil and the circular coil (**2013**)

15. A square coil of side 10 cm has 20 turns and carries a current of 12 A. The coil is suspended vertically and normal to the plane of the coil, makes an angle θ with the direction of a uniform horizontal magnetic field of 0.80 T. If the torque, experienced by the coil equals 0.96 N-m, find the value of θ. **[Delhi 2010C]**

A rectangular loop of wire of size 2.5 cm × 4 cm carries steady current of 1 A. A straight wire carrying 2 A current is kept near the loop as shown. If the loop and the wire are coplanar, find the (*i*) torque acting on the loop and (*ii*) the magnitude and direction of the force on the loop due to the current carrying wire. **[Delhi 2012]**