

CLASS : XII
PHYSICS ASSIGNMENT

Unit III - Magnetic Effects of Currents and Magnetism

1. State two factors on which sensitivity of a moving coil galvanometer depends?
2. How will you convert a moving coil galvanometer into an ammeter?
3. Why should an ammeter have low resistance?
4. What is the resistance of an ideal ammeter and a voltmeter?
5. What will be the path of a charged particle moving along the direction of a uniform magnetic field?
6. An ammeter and a millimeter are converted from the same galvanometer. Out of the two, which should have higher resistance?
7. What is the path followed by a charged particle when it moves at an angle (other than 0° , 90° or 180°) to the magnetic field?
8. Can a cyclotron accelerate neutrons?
9. An electron and proton moving with same speed enter the same magnetic field region at right angles to the direction of the field. For which of the two particles will the radius of circular path be smaller?
10. A cyclotron is not suitable to accelerate electron. Why?
11. What is magnetic permeability?
12. What is pole strength? Are the two pole of a magnet equally strong?
13. Define neutral point in the magnetic field of a bar magnet?
14. If a compass is taken to magnetic north pole of earth. What will be the direction of the needle?
15. What is horizontal component of earth's magnetic field? Where is it maximum?
16. What type of magnetic material is used in making permanent magnets?
17. What are the properties of permanent magnets?
18. Write down the dimensional formula of magnetic flux?
19. What is a domain?
20. State and explain biotsavart law for magnetic field due to a current element?
21. Using biotsavart law deduce an expression for the magnetic field at the centre of a current carrying circular loop?
22. State and explain lorentz force?
23. What is current sensitivity? How the current sensitivity of a galvanometer can be increased?
24. Suppose a helical spring is suspended from the roof of a room and very small weight is attached to its lower end. What will happen to the spring when a current is passed through it. Give reason to support your answer?
25. What are magnetic lines force? Write any four important properties of these lines.
26. State Gause's theorem in magnetism. What does it indicate?
27. Discuss curie law in magnetism?
28. A beam of alpha particles and of protons of the same velocity v enter a uniform magnetic field at right angle to the field line. The particles describe the circular path. What is the ratio of the radii of these two circles?
29. What is radial magnetic field? How it is obtained in moving coil galvanometer?

30. In an hydrogen atom an electron of charge 'e' revolves in an orbit of radius 'r' with a speed 'v'. Prove that the magnetic moment associated with the electron is given by $\frac{evr}{2}$?
31. A solenoid of length 0.5m has a radius of 1 cm and is made up of 500 turns. It carries a current of 5.amp what is the magnitude of the magnetic field inside the solenoid.
32. A Short bar magnet has a magnetic moment of 0.48 J/T. Give the direction and magnitude of the magnetic field produced by the magnet at a distance of 10cm from the centre of the magnet on
- the axis
 - the equatorial lines of magnet?
33. Derive a relation between permeability and susceptibility?
34. Derive an expression for the potential energy of a magnetic dipole placed in a uniform magnetic field at an angle Q with it?
35. Using a label diagram show the elements of earth's magnetic field obtain relations between them?
36. Explain paramagnetism on the basis of electron theory?
37. Discuss ferromagnetism on the basis of domain theory?
38. How does an atom act as a magnetic dipole? Derive an expression for dipole moment of the atom hence define Bohr Magnetron?
39. Explain how will you convert a galvanometer into an ammeter of given range?
40. Explain how will you convert a galvanometer into a voltmeter of given range?
41. Derive a formula for the force between two parallel straight conductors carrying the current in opposite direction and write the nature of force. Hence define an ampere?
42. Using ampere's circuital law deduce an expression for the magnetic field due to a toroidal solenoid?
43. Describe the principle and construction of moving coil galvanometer prove that the current flowing in the coil is directly proportional to its deflection?
44. Explain with the help of a labelled diagram the principle, construction and working of a cyclotron. What are its limitation?
45. Using Biot-Savart law, obtain an expression for the magnetic field at a point due to an infinitely long straight conductor carrying current I?
46. The frequency of a cyclotron oscillator is 10^7 Hz. What should be the operating magnetic field for accelerating protons? If the radius of the dees of the cyclotron is 6×10^{-1} m. Calculate the energy of the proton beam produced by it in Mev ($M_p = 1.67 \times 10^{-27}$ Kg) $e=1.6 \times 10^{-19}$ C, $1\text{Mev} = 1.6 \times 10^{-13}$ J)
47. A small square loops of side 2mm is placed inside and normal to the axis of a long solenoid. The solenoid has a total of 2000 turns of wire uniformly wound over its total length of 2m, if the current flowing in the solenoid wire changes from 1A to 3A in $\frac{(\pi)}{10^7}$ th of a second. Calculate the emf induced in the square loop.