

Winter Vacation Home-Work, 2017-18
Class- XII

1. Two electric lines of force never intersect. Why?
2. Define electric dipole moment of an electric dipole. Show mathematically that the electric field intensity due to a short dipole at a distance r along its axis is twice the intensity at the same distance along the equatorial axis .
3. An electric dipole is held at an angle θ in a uniform electric field E . Find an expression for torque acting on it.
4. State Gauss's law of electrostatics. Apply this theorem to calculate the electric field due to
 - i. A uniformly charged spherical shell at a point
 - a. Inside the shell
 - b. On the shell
 - c. Outside the shell
 - ii. At a point near a thin infinite plane sheet of charge density $\sigma \text{ Cm}^{-2}$.
 - iii. An infinitely long straight wire of linear charge density $\lambda \text{ Cm}^{-1}$.
5. Obtain expression for the capacitance of a parallel plate capacitor.
6. Deduce an expression for total energy stored in a parallel plate capacitor and relate it to the electric field.
7. What is dielectric? A dielectric slab of thickness t is kept between the plates of a parallel plate capacitor separated by a distance d . Derive the expression for the capacitance of the capacitor.
8. Derive the expression for the resistivity of a conductor in terms of number of density of free electrons and relaxation time.

9. State Kirchhoff's laws of electric circuit.
 10. Establish the relation between current and drift velocity.
 11. What is the principle of Potentiometer? Explain how a potentiometer can be used to compare the emf's of two cells?
 12. How a potentiometer is used to determine the internal resistance of a cell.
 13. State Biot-Sevart law. Use it to obtain the magnetic field at an axial point, distance r from the centre of a circular coil of radius a carrying a current I .
 14. State Ampere's circuital law. Derive an expression for the magnetic field along the axis of an air-cored solenoid, using this law.
 15. With the help of a labeled diagram, explain the principle, construction, theory and working of a cyclotron. State its limitations.
 16. Derive a mathematical expression for the force per unit length acting on each of the two straight parallel conductors carrying current. Hence define one ampere of current.
 17. Describe the principle and construction of a moving coil galvanometer. Prove that current flowing in the coil is directly proportional to its deflection.
- What is the importance of radial field?
18. How a galvanometer can be converted into an ammeter and a voltmeter?
 19. Name and define the various parameters required to completely specify earth's magnetic field at a place. Show them in a labeled diagram.
 20. An inductor L , capacitor C and a resistor R are connected in series in an ac circuit. Deduce with the help of suitable phasor diagrams, a mathematical expression for impedance of this circuit. What is meant by resonance of circuit?
 21. Draw a labeled circuit arrangement showing the windings of primary and secondary coils in a transformer. Explain the

underlying principle and working of a transformer. Write sources of energy loss n this device.

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CLASS-XI

Solve all numerical problems of exercise questions of NCERT BOOK of following chapters:-

1. Motion in one dimension
2. Motion in two dimension
3. Laws of motion
4. Work, energy and power