DAV KAPILDEV PUBLIC SCHOOL,KADRU,RANCHI

SUMMER HOLIDAY HOMEWORK

SESSION-2020-21

CLASS-XII

SUBJECT-PHYSICS

SECTION-A

[*MOST IMPORTANT QUESTIONS FOR BOARD EXAMS]

ELECTROSTATICS

1. Derive an expression for the electric field at a point on the axial position of an electric dipole.
2. Derive an expression for the electric field at a point on the equatorial position of an electric dipole.
3. Derive an expression for the torque on an electric dipole in a uniform electric field.
4. Derive an expression for the work done in rotating an electric dipole in an uniform electric field.
5. Derive an expression for the energy stored (potential energy) in a dipole in a uniform electric field.
6. Derive an expression for the electrostatic potential energy of a system of point charges.
7. State Gauss theorem and apply it to find electric field at a point due to (a) a line of charge (b) a plane sheet of charge (c) a charged spherical conducting shell.
8. State Coulomb's law and express it in vector form. Derive it using Gauss theorem.
9. Explain the principle of capacitor and derive an expression for the capacitance of a parallel plate capacitor.
10. Derive an expression for the effective capacitance when the capacitors are connected in (a)series and (b) parallel.
11. Derive an expression for the energy stored in a capacitor. Show that whenever two conductors share charges by bringing them into electrical contact, there is a loss of energy.
12. Derive an expression for the capacitance of a parallel plate capacitor with (a) a dielectric slab (b) a metallic plate in between the plates of the capacitor.
13. Define electric potential at a point. Derive an expression for the electric potential at a point due to (a) a point charge (b) system of point charges (c) a dipole.
14. Show that the work done in an electric field is independent of path.
15. What are dielectrics? Distinguish polar and nonpolar dielectrics. Define the term Polarization vector.

CURRENT ELECTRICITY

1. Define drift velocity and derive an expression for it.
2. Derive the expression $I=nAev_d$.
3. Deduce Ohm's law from elementary ideas and hence write an expression for resistance and resistivity.
4. Derive an expression for conductivity in terms of mobility
5. Explain the color coding of carbon resistors.
6. Derive an expression for the current in a circuit with external resistance R when a) n identical cells of emf E and internal resistance rare connected in series (b) m identical cells (are connected in parallel
7. State and explain Kirchhoff's laws
8. State and explain the principle of Wheat Stone's principle. Deduce it using Kirchhoff's laws.
9. Explain the variation of resistance and resistivity with temperature and hence define temperature coefficient of resistance and resistivity

MAGNETISM

1. State Biot-Savart, law and apply it to find the magnetic field due to a circular loop carrying current at a point (a) at its centre (b) on the axis
2. State Ampere's circuital law and apply it to find the magnetic field (a) inside a current carrying solenoid
   (b) inside a current carrying toroid

3. Apply Ampere's circuital law to determine the magnetic field at a point due to a long straight current carrying conductor.
4. Derive an expression for the force on a current carrying conductor in a uniform magnetic field.
5. Derive an expression for the force between long straight conductors carrying current and hence define 1 ampere.
6. Derive an expression for the torque on a current carrying loop in a uniform magnetic field.
7. Describe the principle construction and working of a Moving coil galvanometer.
8. What is radial magnetic field? What is its importance in a moving coil galvanometer? How is a radial magnetic field realized in moving coil galvanometers?
9. Describe the principle construction and working of a cyclotron. Explain why an electron cannot be accelerated using a cyclotron.
10. Describe the motion of a charged particle in a magnetic field when it enters the field (a) perpendicular to the field lines (b) obliquely making and angle θ with the field lines.
11. Derive an expression for the magnetic dipole moment of a revolving electron and hence define Bohr magneton.

SECTION-B

Solve NCERT Exercises of the following chapters

1. Electric charges and field
2. Electrostatic Potential and Capacitance
3. Current Electricity
4. Moving charges and Magnetism

SECTION-C

Prepare notes of the following chapters

1. Electric charges and field
2. Electrostatic Potential and Capacitance
3. Current Electricity
4. Moving charges and Magnetism