HOME ASSIGNMENT OF WINTER BREAK: 2024-25 (SUB: PHYSICS)
CLASS: XI

1. Explain the elastic properties of matter on the bass of interatomic forces.
2. Derive an expression for the elastic potential energy stored in a stretched wire under stress.
3. Draw a graph of the applied force versus resulting elongation of a metallic wire.
4. What are the factors affecting elasticity? What is elastic fatigue?
5. State and explain laws of gravitation..
6. Establish a relation between 'g' and 'G'.
7. How does acceleration due to gravity vary with (a) altitude (b) lattitude.
8. Define gravitational potential. Find an expression for it.
9. Define escape velocity. Find an expression for it.
10. What is orbital velocity of a satellite. Derive an expression for it.
11. mention the characteristics of geo- stationary satellite.
12. Prove that Escape velocity = $\sqrt{2}$ X Orbital velocity
13. State and explain theorem of parallel and perpendicular axes.
14. Define centripetal force. Find an expression for a body of mass m moving with a constant velocity on a circular path.
15. State and explain parallelogram law of addition of vectors.
16. Prove that a freely falling body obeys the law of conservation of energy.
17. Define conservative and non conservative forces with suitable examples.
18. Show that change in kinetic energy is equal to work done.
19. Write some examples of elastic, inelastic and perfectly inelastic collisions.
20. State and explain Hook's law.
21. define modulii of elasticity.
22. Solve the following exercise numerical problems of NCERT book of physics:
    (a) chapter: Gravitation
        Question numbers: - 1, 2, 8, 9, 12, 14, 15, 16, 20

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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
    ii. At a point near a thin infinite plane sheet of charge density σ Cm^{-2}.
    iii. An infinitely long straight wire of linear charge density λCm^{-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.
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 direction.
18. What is the importance of radial field?
19. How a galvanometer can be converted into an ammeter and a voltmeter?
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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