

## XII-PHYSICS

### Important Detail :

#### Unit –1 Electrostatics

- 1) Derive an expression for electrostatic potential due to an electric dipole.
- 2) Obtain the expression for electric field due to an infinitely long charged wire.
- 3) Obtain the expression for electric field due to a charged infinite plane sheet.
- 4) Explain in detail the effect of a dielectric placed in a parallel plate capacitor.
- 5) Derive an expression for resultant capacitance when capacitors are connected in series and parallel.
- 6) Explain in detail the construction and working of a Van de Graaff generator.

#### Unit –2 Current Electricity

- 7) Explain the equivalent resistance of a series and parallel resistor network.
- 8) Obtain the condition for bridge balance in wheatstone's bridge.
- 9) Explain the determination of unknown resistance using meter bridge.
- 10) How the emf of two cells are compared using potentiometer?
- 11) Explain the determination of the internal resistance of a cell using potentiometer.

#### Unit –3 Magnetism & magnetic effects of electric current

- 12) Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current.
- 13) Obtain a relation for the magnetic field at a point along the axis of a circular coil carrying current.
- 14) Derive the expression for the force between two parallel current carrying conductor.
- 15) Derive the expression for the force on a current carrying conductor in a magnetic field.
- 16) Explain about working of moving coil galvanometer.

#### Unit –4 Electromagnetic induction

- 17) Show that the mutual inductance between a pair of coils same  $M_{12} = M_{21}$ .
- 18) Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.
- 19) Explain the construction and working of transformer.
- 20) Find out the phase relationship between voltage and current in a pure inductive circuit.

#### Unit – 5 Electromagnetic Waves

- 21) Write down the Maxwell equations in integral form.
- 22) Explain the types of emission spectrum.
- 23) Explain the types absorption spectrum.

#### Unit – 6 Ray Optics

- 24) Derive the mirror equation and the equation for lateral magnification.
- 25) Obtain the equation for radius of illumination (or) Snell's window.
- 26) Derive the equation for refraction at single spherical surface.
- 27) Obtain lens maker's formula and mention its significance.
- 28) Derive the equation for angle of deviation produced by a prism and the obtain the equation for refractive index of material of the prism.

#### Unit – 7 Wave Optics

- 29) Prove law of reflection using Huygens' principle.
- 30) Prove law of refraction using Huygens' principle.
- 31) Obtain the equation for resultant intensity due to interference of light.
- 32) Explain the Young's double slit equation experimental setup and obtain the equation path difference.
- 33) Obtain the equation for bandwidth in Young's double slit experiment.
- 34) Discuss about the simple microscope and obtain the equations for magnification for near point focusing and normal focusing.
- 35) Explain about compound microscope and obtain the equation for the magnification.

#### **Unit – 8 Dual nature of radiation & matter**

- 36) What do you mean by electron emission ? Explain briefly various methods of electron emission.
- 37) Obtain Einstein's photoelectric equation with necessary explanation.
- 38) Give the construction and working of photo emissive cell.
- 39) Briefly explain the principle and working of electron microscope.
- 40) How do we obtain characteristics X – ray spectra?

#### **Unit – 9 Atomic and Nuclear physics**

- 41) Explain the J.J.Thomson experiment to determine the specific charge of electron.
- 42) Discuss the Millikan's oil drop experiment to determine the charge of an electron.
- 43) Explain the variation of average binding energy with the mass number using graph and discuss about its feature.
- 44) Obtain the law of radio activity.
- 45) Describe the working of nuclear reactor with a block diagram.

#### **Unit – 10 Electronics & Communication**

- 46) Draw the circuit diagram of a halfwave rectifier and explain its working.
- 47) Explain the construction and working of full wave rectifier.
- 48) Explain the working principle of a solar cell. Mention its application.
- 49) State and prove de Morgan's first and second theorem.
- 50) Explain the amplitude modulations with necessary diagrams.

#### **Important 3marks :**

##### **Unit –1 Electrostatics**

- 1) Derive an expression for the torque experienced by a dipole due to a uniform electric field.
- 2) Obtain an expression for potential energy due to a collection of three point charges which are separated by finite distances.
- 3) Obtain the expression for the capacitance for a parallel plate capacitor.
- 4) Obtain the expression for energy stored in a parallel plate capacitor.

##### **Unit –2 Current Electricity**

- 5) Explain the determination of the internal resistance of a cell using voltmeter.
- 6) Distinguish between drift velocity and mobility.
- 7) State the applications of Seebeck effect.

**Unit –3 Magnetism & magnetic effects of electric current**

- 8) Find the magnetic field due to a long straight conductor using Ampere's circuital law.
- 9) Discuss the conversion of a galvanometer into voltmeter.
- 10) Give an account of magnetic Lorentz force.
- 11) Give the properties of dia / para / ferro magnetic materials.

**Unit –4 Electromagnetic induction**

- 12) Obtain an expression for motional emf from Lorentz force.
- 13) Mention the various energy losses in a transformer.
- 14) Prove that total energy is conserved during LC oscillations.
- 15) List the advantages of AC over DC

**Unit – 5 Electromagnetic Waves**

- 16) Write a short notes on i) micro waves ii ) X – Rays iii ) Radio waves iv) visible spectrum
- 17) Write down the properties of electromagnetic waves.

**Unit – 6 Ray Optics**

- 18) Obtain the equation for lateral displacement of light passing through a glass slab.
- 19) Derive the relation between f and R for a spherical mirror.
- 20) Obtain the equation for apparent depth.

**Unit – 7 Wave Optics**

- 21) Differentiate between Fresnel and Fraunhofer diffraction.
- 22) What is Fresnel's distance? Obtain the equation for Fresnel's distance.
- 23) State and obtain Malus's law.
- 24) List the uses of polaroids.

**Unit – 8 Dual nature of radiation & matter**

- 25) Derive an expression for de Broglie wavelength of electrons.
- 26) List out the characteristics of photons.
- 27) Give the applications of photocell.

**Unit – 9 Atomic and Nuclear physics**

- 28) Discuss the spectral series of hydrogen atom.
- 29) Discuss the alpha decay process with example.
- 30) Discuss the beta decay process with example.
- 31) Discuss the gamma emission process with example.

**Unit – 10 Electronics & Communication**

- 32) Transistor functions as a switch. Explain.
- 33) List out the advantages and limitations of frequency modulation.
- 34) Distinguish between intrinsic and extrinsic semiconductors.
- 35) Distinguish between avalanche breakdown and Zener breakdown.