XII - PHYSICS
1. ELECTROSTATICS

2 MARK - QUESTIONS

1. Write down Coulomb"s law in vector form and mention what each term represents.
2. State Gauss law in electrostatics.
3. What is an electric dipole? Give a few examples.
4. What is the general definition of electric dipole moment?
5. Define "Electrostatic potential". Give its unit.
6. Define potential difference. Give its unit.
7. Define Electrostatic potential energy . Give its unit.
8. What is corona discharge (or) action at points ?
9. What is meant by quantisation of charges?
10. Write short notes on superposition principle.
11. Define capacitance of a capacitor. Give its unit.
12. Define electrostatic energy density.
13. Define electric field. Give its unit.
14. Define Electric flux. Give its unit.
15. State conservation of electric charges.

3 MARK - QUESTIONS

1. Distinguish between Coulomb force and Gravitational force.
2. Give the applications and disadvantage of capacitors.
3. Derive an expression for torque experienced by an electric dipole placed in the uniform electric field.
4. Obtain an expression for electric potential at a point due to a point charge.
5. Derive an expression for energy stored in a capacitor .
6. Derive an expression for capacitance of parallel plate capacitor.
7. Obtain Gauss"s law from Coulomb"s law.

5 MARK - QUESTIONS

1. Calculate the electric field due to a dipole on its axial line.
2. Calculate the electric field due to a dipole on its equatorial line.
3. Derive an expression for electrostatic potential due to electric dipole.
4. Derive the expression for resultant capacitance, when capacitors are connected in series and in parallel.
5. Obtain an expression for electric field due to an infinitely long charged wire.

6. Explain in detail the construction and working of Van de Graff generator.
7. Obtain an expression for the electric field due to an charged infinite plane sheet.
8. Explain in detail the effect of introducing a dielectric medium between the plates of a parallel plate capacitor, when the capacitor is disconnected from the battery.
9. Obtain an expression for electric field due to an uniformly charged spherical shell.

2. CURRENT ELECTRICITY

2 - MARK QUESTIONS
1. Electric current is a scalar quantity why?
2. Distinguish between drift velocity and mobility.
3. Define current density and give its unit.
4. Give the microscopic form of ohm's law.
5. Give the macroscopic form of ohm's law.
6. What are ohmic and non-ohmic materials?
7. Define electrical resistivity and give its unit.
8. Define temperature coefficient of resistivity.
9. What is known as superconductivity?
10. What is electric energy and electric power ?
11. Derive the expression for power P=VI in the electrical circuit.
12. Write down the various forms of expression for power in electrical circuits.
13. State Kirchhoff's first rule (current rule or junction rule).
14. State Kirchhoff's second rule (voltage rule or loop rule).
15. Define electric current and give its unit.
16. Define internal resistance of a battery .
17. What is called mean free time?
18. What is Seeback effect?
19. What is Thomson effect?
20. What is Peltier effect?
21. State the applications of seeback effect.

5 - MARK QUESTIONS
1. Describe the microscopic model of current and obtain general form of ohm's law.
2. Obtain the macroscopic form of ohm's law from its microscopic form.

3. Explain the equivalent resistance of a series and parallel resistor network.
4. Explain the determination of the internal resistance of a cell using voltmeter.
5. Explain series and parallel connections in cell.
6. State and explain Kirchoff's rules.
7. Obtain the condition for bridge balance in wheatstone's bridge.
8. Explain the determination of unknown resistance using a metre bridge.
9. Explain the determination of the internal resistance of a cell using a potentiometer.

3 .MAGNETISM AND MAGNETIC EFFECTS OF ELECTRIC CURRENT

2 MARK - QUESTIONS
1. Define Magnetic Dipole Moment.
2. Define Magnetic flux. Give its unit.
3. State Coulomb's inverse law of magnetism.
4. Define Magnetic dipole moment of current loop.
5. State Fleming's left hand rule.
6. Define current sensitivity of a galvanometer.
7. How the current sensitivity of a galvanometer can be increased?
8. Why Phosphor-Bronze is used as suspension wire in galvanometer?
9. Define Voltage sensitivity of the galvanometer.
10. Explain the concept of velocity selector.
11. Define - 1 ampere.

3 - MARK QUESTIONS
1. Give properties of magnetic field lines.
2. State and explain Biot savart law.
3. How is a galvanometer converted into an ammeter?
4. How is a galvanometer converted into a voltmeter ?
5. Explain Lorentz force.

5 - MARK QUESTIONS
1. Deduce the relation for magnetic field at a point due to an infinitely long straight conductor carrying current.
2. Obtain a relation for the magnetic field at a point along the axis of a circular coil carrying current.
3. Obtain an expression for magnetic field due to the current carrying wire of infinite length using Ampere's law.

4. Obtain an expression for magnetic field due to long current carrying solenoid.
5. Obtain an expression for the force on a current carrying conductor placed in a magnetic field.
6. Obtain a force between two long parallel current carrying conductors. Hence define ampere.

4. ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT

2 - MARK QUESTIONS
1. What is electromagnetic induction or Faraday's I law?
2. Write Faraday's laws of electromagnetic induction?
3. State Fleming's right hand rule.
4. Mention the ways of producing induced emf.
5. Define power factor.
6. Define the efficiency of transformer.
7. Why the capacitor blocks DC?
8. What are the uses of RLC circuits?
9. What is wattless current?
10. Distinguish step-up and step-down transformer.
11. What do you mean by self-induction?
12. What is meant by mutual induction?
13. Define average value of an alternating current.
14. Define RMS value of an alternating current.
15. What are phasors?
16. Define electric resonance.
17. What do you mean by resonant frequency?
18. What are LC oscillations?
19. Define the unit of self - inductance (or) Define one henry.
20. An inductor blocks AC but it allows DC. Why? and How?

3 -MARK QUESTIONS
1. Obtain the expression for Self-inductance of a long solenoid.
2. Explain the mutual induction between two long solenoids. Obtain an expression for the Mutual inductance.
3. An inductor of inductance L carries an electric current i. How much energy is stored while establishing the current in it?
4. How will you induce an emf by changing the area enclosed by the coil?
5. Mention the various energy losses in a transformer. How it is minimized?

6. Find out the phase relationship between voltage and current in a pure resistor circuit.
7. Obtain an expression for motional emf from Lorentz force.
8. What are Advantages and disadvantages of AC over DC?
9. Prove that the total energy is conserved during LC oscillations.

5 -MARK QUESTIONS
1. Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.
2. Explain the construction and working of a transformer.
3. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.
4. Find out the phase relationship between voltage and current in a pure inductor / a capacitor circuit.

5 . ELECTROMAGNETIC WAVES

2- MARK QUESTIONS
1. What is displacement current?
2. What are electromagnetic waves?
3. What are Fraunhofer lines?
4. Write down the integral form of modified Ampere's circuital law.
5. Write notes on Gauss's law in magnetism.
6. Why are electromagnetic waves non-mechanical?
7. Write notes on Ampere-Maxwell law.
8. Give any two uses of (i) IR radiation, (ii) Microwaves and (iii) UV radiation.

3 - MARK QUESTIONS
1. Discuss briefly the experiment conducted by Hertz to produce and detect electromagnetic spectrum.
2. Write short notes on (i) microwaves (ii) X-ray (iii) radio waves (iv) visible spectrum
3. Write down the properties of electromagnetic waves.

5 - MARK QUESTIONS
1. What is emission spectra? Explain their types.
2. What is absorption spectra? Explain their types.
3. Write down Maxwell equations in integral form.

6. RAY OPTICS

2 - MARK QUESTIONS

1. Laws of reflection.
2. Laws of refraction.
3. What is principle of reversibility?
4. What is total internal reflection?
5. What is Rayleigh's scattering?
6. Why does sky appear blue?
7. What is the reason for reddish appearance of sky during sunset and sunrise?
8. Why do clouds appear white?
9. Why does rain cloud appear dark?
10. What are paraxial rays and marginal rays?
11. How are rainbows formed?
12. Why do stars twinkle?
13. What is optical path?
14. Why the sky appears dark for the astronauts.

3 - MARK QUESTIONS

1. Obtain the equation for apparent depth.
2. Derive the relation between f and R for a spherical mirror.

5 - MARK QUESTIONS

1. Derive the mirror equation and the equation for lateral magnification.
2. Obtain lens maker's formula.
3. What is dispersion? Obtain the equation for dispersive power of a medium.
4. Describe Fizeau's method to determine speed of light.
5. Derive the equation for angle of deviation produced by a prism and thus obtain the equation for refractive index of material of the prism.

7. WAVE OPTICS

2 - MARK QUESTIONS

1. What is astigmatism?
2. Differentiate interference and diffraction.
3. State Huygens principle ?
4. What are coherent sources?
5. What is diffraction?
6. Define Fresnel's distance?
7. State Rayleigh's criterion?

8. State Malus's law.

9. Define wavefront.

10. What are the conditions for obtaining clear and broad interference fringes?

11. Define polarising angle.

3 - MARK QUESTIONS

1. State and explain Brewster's law.

2. Explain the pile of plates.

3. Write uses of polaroids.

5 - MARK QUESTIONS

1. Obtain the equation for bandwidth in young's double slit experiment.

2. Discuss about simple microscope and obtain equation for magnification.

3. Explain about compound microscope and obtain equation for magnification.

4. Discuss about diffraction in single slit.

8. DUAL NATURE OF RADIATION AND MATTER

2 - MARK QUESTIONS

1. Define stopping potential.

2. Define work function of a metal.

3. What is photoelectric effect?

4. Define surface barrier.

5. What is photoelectric cell?

6. What is De Broglie hypothesis?

7. Define threshold frequency.

3 - MARK QUESTIONS

1. Derive the expression of De Broglie wavelength of the electron.

2. Write the characteristics of photons.

3. Give the application of photo cells.

4. Write a note on continuous X-ray spectrum.

5. Write a note on characteristic X-ray spectra.

6. Explain the applications of X-rays.

5- MARK QUESTIONS

1. State the Laws of Photoelectric effect.

2. Obtain Einstein's photoelectric equation with necessary explanation.

3. Give the construction and working of photo emissive cell.

4. Explain the principle and working of electron microscope.

5. Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.

OTHER IMPORTANT QUESTIONS
1. Write the expression for the de Broglie wavelength associated with a charged particle of charge q and mass when it is accelerated through a potential V.
2. Why we do not see the wave properties of a baseball?
3. A proton and an electron have same kinetic energy. Which one has greater De Broglie wavelength. Justify.
4. Write the relationship of de Broglie wavelength λ associated with a particle of mass m in terms of its kinetic energy K.

9. ATOMIC AND NUCLEAR PHYSICS
2 - MARK QUESTIONS
1. Define one Curie.
2. Define one atomic mass unit (u).
3. Define activity.
4. Mass defect
5. What are the properties of neutrino?
6. What are the properties of Nuclear Force?
7. Define Half life time.
8. Define mean life.
9. Define Impact factor.
10. Define excitation energy.
11. Define Ionization energy (or) Binding energy.
12. Explain Proton – Proton cycle
13. Define distance of closest approach.
14. On what particles neutron and proton are made up of ?

3 - MARK QUESTIONS
1. What are the properties of cathode rays?
2. Explain Alpha decay, beta decay and gamma emission.
3. Write down the properties of neutron.
4. State the postulates of Bohr atom model.
5. Explain the following in symbolic representation.(a) Alpha decay (b) Beta decay (c) Gamma emission.
6. Drive an expression for the Energy of an electron in the nth orbit.

7. Give the results of Rutherford alpha particle scattering experiment.
8. Drawbacks of Rutherford atom model.

5 - MARK QUESTIONS
1. Obtain the expression for Radius of nth orbit of an electron.
2. Explain JJ Thomson experiment to determine specific charge.
3. Obtain the expression for number of atoms present at any instant and also derive the equation for half life period. (or) State and explain Radioactive law of disintegration.
4. Explain the spectral series of a hydrogen atom.
5. What is a nuclear reactor? Explain its essential parts.
6. Discuss the Millikan's oil drop experiment for the determination of charge of an electron.
7. Explain the Binding energy curve.

10. ELECTRONICS AND COMMUNICATION SYSTEMS
2- MARK QUESTIONS
1. Distinguish intrinsic semiconductor and extrinsic semiconductor.
2. What is called doping?
3. Differentiate - donor and acceptor impurities.
4. What is called the depletion region?
5. Define potential barrier.
6. What is rectification?
7. Differentiate Zener breakdown, Avalanche breakdown.
8. Give the uses of Zener diode.
9. Define input impedance.
10. Define output impedance.
11. Draw the circuit diagram for CB configuration.
12. Draw the circuit diagram for CE configuration.
13. Draw the circuit diagram for CC configuration.
14. What is modulation?
15. What is Amplitude modulation?
16. What is frequency modulation?
17. What is phase modulation?
18. Compare PM and FM.

3 - MARK QUESTIONS

1. Explain how Zener diode acts as a voltage regulator.
2. Explain how a transistor acts as a switch .
3. Explain the formation of depletion layer.
4. Write the advantages and limitations of amplitude modulation (AM).
5. Write the advantages and limitations of frequency modulation (FM).

5 - MARK QUESTIONS

1. Draw the circuit diagram of a half wave rectifier and explain its working.
2. Draw the circuit diagram of a full wave rectifier and explain its working.
3. What is modulation? Explain the types of modulation with necessary diagrams.
4. State and prove De Morgan's theorem.

ADDITIONAL QUESTIONS

1. What is valence band?
2. What is conductivity?
3. What is forbidden energy gap?
4. Why is temperature coefficient negative for semiconductor?
5. What do you mean by diffusion current.
6. What do you mean by Biasing a diode? Mention its types.
7. A diode is called as a unidirectional device. Explain.
8. Explain the flow of current in a NPN transistor.
9. Define current gain (α, β) and deduce the relationship between them.
10. What do you mean by operating point in a transistor?
11. What is an integrated circuit?
12. What is resting frequency?
13. Prove the Boolean identity AC + ABC = AC and give its circuit description.

11. RECENT DEVELOPMENTS IN PHYSICS

2- MARK QUESTIONS

1. Distinguish between Nanoscience and Nanotechnology.
2. What is the difference between Nanomaterials and Bulk materials?
3. Give examples for Nano structure in nature.
4. What is robotics?

3 & 5 - MARK QUESTIONS

1. Discuss the function of key components in Robots.
2. Give the types of robots.