Class XII : Physics : Pre-Board/ Board Final Exam : 2022-23 : Marks 70

Blue Print of Distribution of Marks

Unit	Topics	MCQ (1)	VSA (1)	SA I (2)	SA II (3)	LA II (5)	Total Marks
I	Chapter–1:ElectricChargesandFields	1x1	-	2x1	-	5x1	16
	Chapter–2:ElectrostaticPotentialand Capacitance	1x1	-		-		
II	Chapter–3:CurrentElectricity	1x1	1x1	2x1	3x1		
MagneticEffectsofCurrentandMagnetism							
III	Chapter–4: MovingCharges andMagnetism	-	1x1	2x1	3x1	5x1	17
	Chapter–5:Magnetism andMatter	1x1					
IV	Chapter–6:ElectromagneticInduction	-	1x1				
	Chapter–7:AlternatingCurrent	1x1	-	-	3x1		
ElectromagneticWaves							
V	Chapter–8:ElectromagneticWaves	-	-	-	3x1	5x1	18
VI	Chapter–9:RayOpticsandOpticalInstruments	1x1	1x2	2x1	-		
	Chapter–10: WaveOptics	1x1	1x1	-	3x1		
VII	Chapter–11:DualNatureofRadiationandMatter	1x1	1x1	2x1	-	-	12
VIII	Chapter–12:Atoms	1x1	1x1	-	-	-	
	Chapter–13:Nuclei	-	1x1	2x1	3x1	-	
IX	Chapter–14:SemiconductorElectronics:Materials,Devicesand Simple Circuits	1x1	1x1	2x1	3x1	-	7
Total Marks (Questions)		1x10 (10)	1x10 (10)	2x7 (7)	3x7 (7)	5x3 (3)	70 (37)

SYLLABUS : CLASS XII : PHYSICS : 2022-23 : MARKS 70

UNIT	TOPICS	MARKS
Unit–I	**Electrostatics**	**16**
	Chapter–1: Electric Charges and Fields	
	Chapter–2: Electrostatic Potential and Capacitance	
Unit-II	**Current Electricity**	
	Chapter–3: Current Electricity	
Unit-III	**Magnetic Effects of Current and Magnetism**	**17**
	Chapter–4: Moving Charges and Magnetism	
	Chapter–5: Magnetism and Matter	
Unit-IV	**Electromagnetic Induction and Alternating Currents**	
	Chapter–6: Electromagnetic Induction	
	Chapter–7: Alternating Current	
Unit–V	**Electromagnetic Waves**	**18**
	Chapter–8: Electromagnetic Waves	
Unit–VI	**Optics**	
	Chapter–9: Ray Optics and Optical Instruments	
	Chapter–10: Wave Optics	
Unit–VII	**Dual Nature of Radiation and Matter**	**12**
	Chapter–11: Dual Nature of Radiation and Matter	
Unit–VIII	**Atoms and Nuclei**	
	Chapter–12: Atoms	
	Chapter–13: Nuclei	
Unit–IX	**Electronic Devices**	**7**
	Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits	
Total		**70**

Unit I: Electrostatics

Chapter–1: Electric Charges and Fields

Electric Charges, Conservation of charge, Coulomb's law- force between two point-charges, forces between multiple charges; superposition principle and continuous charge distribution.

Electric field, electric field due to a point charge, electric field lines, electric dipole, electric field due to a dipole, torque on a dipole in uniform electric field.

Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).

Chapter–2: Electrostatic Potential and Capacitance

Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two-point charges and of electric dipole in an electrostatic field.

Conductors and insulators, free charges and bound charges inside a conductor.

Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor (no derivation, formulae only).

Unit II: Current Electricity : Chapter–3: Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity, temperature dependence of resistance.

Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's rules, Wheatstone bridge.

Unit III: Magnetic Effects of Current and Magnetism

Chapter–4: Moving Charges and Magnetism

Concept of magnetic field, Oersted's experiment.

Biot - Savart law and its application to current carrying circular loop.

Ampere's law and its applications to infinitely long straight wire. Straight solenoids (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields.

Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors- definition of ampere, torque experienced by a current loop in uniform magnetic field; Current loop as a magnetic

dipole and its magnetic dipole moment, moving coil galvanometer- its current sensitivity and conversion to ammeter and voltmeter.

Chapter–5: Magnetism and Matter

Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only) magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only), torque on a magnetic dipole (bar magnet) in a uniform magnetic field (qualitative treatment only), magnetic field lines.

Magnetic properties of materials- Para-, dia- and ferro- magnetic substances with examples, Magnetisation of materials, effect of temperature on magnetic properties.

Unit IV: Electromagnetic Induction and Alternating Currents

Chapter–6: Electromagnetic Induction

Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Self and mutual induction.

Chapter–7: Alternating Current

Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LCR series circuit (phasors only), resonance, power in AC circuits, power factor, wattless current.

AC generator and transformer.

Unit V: Electromagnetic waves : Chapter–8: Electromagnetic Waves

Basic idea of displacement current, Electromagnetic waves, their characteristics, their transverse nature (qualitative ideas only).

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Unit VI: Optics

Chapter–9: Ray Optics and Optical Instruments

Ray Optics: Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism.

Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

Chapter–10: Wave Optics

Wave optics: Wave front and Huygens's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygens's principle. Interference, Young's double slit experiment and expression for fringe width (No derivation, final expression only), coherent sources and sustained interference of light, diffraction due to a single slit, width of central maximum (qualitative treatment only).

Unit VII: Dual Nature of Radiation and Matter

Chapter–11: Dual Nature of Radiation and Matter

Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light.

Experimental study of photoelectric effect.

Matter waves-wave nature of particles, de-Broglie relation.

Unit VIII: Atoms and Nuclei

Chapter–12: Atoms

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of n^{th} possible orbit, velocity and energy of electron in this orbit, hydrogen line spectra (qualitative treatment only).

Chapter–13: Nuclei

Composition and size of nucleus, nuclear force.

Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.

Unit IX: Electronic Devices : Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits

Energy bands in conductors, semiconductors and insulators (qualitative ideas only).

Intrinsic and extrinsic semiconductors- p- and n-type, p-n junction.

Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode as a rectifier.