# UPPSC LT Assistant Teacher Written Exam

## Syllabus : General Studies

**(1) History of India and Indian National movement: -** In History of India emphasis should be on broad understanding of social, economic and politic aspects of Indian history. In the Indian National movement, the candidates are expected to have synoptic view of the freedom movement, growth of nationalist and attainment of Independence.

**(2) Indian and World Geography**- Physical, Social, Economic Geography of India and the World:- Questions on the Geography of India will relate to Physical, Social & Economic Geography of India. In World Geography only general understanding of the subject will be expected.

**(3) Indian Polity and Governance, Constitution, Political system, Panchayati Raj & Public Policy, rights-issues etc :-** Indian polity and Governance questions will test knowledge of country's Constitution, political system including Panchayati Raj and Community Development.

**(4) Indian Economy and Social Development: -** The candidates will be tested with- respect to problems and relationship between population, Environment, Urbanisation.. broad features of economic policy in India and Indian Culture.

**(5) Current Events of National and International Importance:** This will also include questions on Games & Sports.

**(6) Indian Agriculture: -** The candidates will be expected to have general Understanding of agriculture in India, agricultural produce and its marketing.

**(7) General Science:-**Questions On General Science will cover general appreciation and Understanding of science including matters of everyday observation and special study of any scientific discipline. This will also include questions on role of science and technology in the development of India.

**(8) Elementary Mathematics up to class 10th level:-**Arithmetic, Algebra and Geometry.

# Syllabus Subject : Physics

## General Physics (Mechanics)

Units and Dimensions, Scalar and Vector quantity, Scalar & Vector product and slope, Divergence and curl, Gauss, stokes' theorem and their application, Newton's law of motion, Equation of motion, Kinetic energy and potential energy, Linear and angular momentum, Energy and momentum conservation, Conservative and non-conservative forces, Rotational motion, Centripetal and centrifugal force, Gravity and Central Force, Planetary Motion of Kepler's law, Geo-stationary satellite (Artificial satellite), Gravitational acceleration, field and potential Orbit velocity & Escape Velocity, Simple & Compound Pendulum, Moment of Inertia, Parallel & Perpendicular Axis Theorem, Moment of Inertia of sphere, Ring, Disc & Cylinder, Angular Momentum & Torque, Fluid Motion, Critical Velocity, Viscosity & Stokes' Law, Bernoulli's Theorem & Its Application, Surface Tension, Excess pressure of Curve Surface of Liquids, Surface Energy, Flow of Liquid in Capillary Tube, Elasticity & Elastic Constants and Their Interrelations, Bending of Beam & Torsion of Cylindrical Bodies, Cantilever Beam, Relativity Theory for the Change in Mass, Length & Time, Mass Energy Equivalence Relation.

## Heat

` Concept of Heat & Temperature, Various Thermometer Scale & Absolute Temperature, Thermal expansion of Solid, Liquid & Gases, Heat Conduction, Heat Radiation & Black Body, Rayleigh Jeans and Wien's Law, Plank's Radiation Law, Newton's Law Of Cooling, Stefan Boltzmann Law, Internal Energy and Entropy, Isothermal and Adiabatic Process, Thermodynamics' First & Second Law, Carnot Engine & Its Efficiency, Thermodynamical Relation of Maxwell, Joule Thomson Effect, Clausius Clapeyron Equation.

## Wave & Oscillation

Simple Harmonic Motion, Progressive & Stationary Waves, Wave Motion, Damped Oscillation, Forced Oscillation, Resonance & Resonance Intensity, Superposition Of Waves, Beats & Lissajous Figure, Doppler's Effect.

## Optics

Spherical Mirror and Lens, Refractive Index, Formula Of Focal Length, Combination Of Co-axial Thin Lenses, Eyepiece (Ramsden and Huygens Eyepieces), Chromatic Aberration of Lens, Humans Eye and Their Defect, Interference and Simple Interferometer, Concept Of Diffraction and Polarisation, Fresnel Biprism and Newton Rings, Fresnel- Fraunhofer Diffraction, Rayleigh Scattering, Resolving Power of Optical Instrument, Zone Plate and Grating Theory, Birefringence, Plane Circular and Elliptical Polarisation, Quarter & Half Wave Plate, General Concept of Laser & Ruby and He-Ne Laser.

## Electricity & Magnetism

Cell & Their Internal Resistance and E.M.F., Combination Laws Of Resistance & Capacitance, Electric Current and Ohm's Law, Galvanometer, Ammeter & Voltmeter, Wheat Stone Bridge & Application, Biot-Savart's Law,Ampere's Circuital Law, Electro Magnetic Induction, Inductance & Mutual Inductance, Alternating Current, LCR Circuit, Dia, Para & Ferro-Magnetism, Electromagnetic Maxwell Theorem, Electromagnetic Wave.

## Modern Physics

Atomic Structure, Bohr's Model of Hydrogen Atom, Light & X-Ray Spectrum, Photo electric Effect, Compton Effect, Zeeman, Paschen & Raman Effect, De-Broglie's Wave Theorem, Uncertainty Principle, Radioactivity, Metal, Semiconductor and Insulator, PN - Junction, Zener Diode, Transistor & its application, Logic gates, Truth Table & Boolean Algebra.

# Syllabus Subject : Chemistry

## General Organic Chemistry –

Hyper conjugation, Inductive effect, Resonance, and Aromaticity and their applications. Electrophiles and nucleophiles and reaction intermediates (carbocation, carbanion, free radical, carbine and benzyne)

## Reaction mechanism –

$SN_1$, $SN_2$, $E_1$, and $E_2$ reaction electrophilic addition of alkenes, alkynes and free radical addition of alkenes Nucleophilic addition of carbonyl compounds. Electrophilic aromatic substitution, ortho, para/meta directing groups and activating and deactivating groups in ArSE reaction.

## Mechanism of name reaction –

Aldol reaction, Perkin reaction, Cannizzaro reaction, Benzoincondensation, Witting reaction, Reimer - Tiemann reaction, Hoffmann bromamide reaction, Knoevenagel reaction, Michael addition.

## Carbohydrates –

(only glucose and fructose) mutarotation formation of osazone, oxidation and reduction.

## Polymer –

Natural (starch cellulose) rubber and silk) and synthetic polymers, Nylon, Terylene, Polyethylene, PVC and teflon).

## Isomerism –

Structural and stereoisomerism (enantiomerism, diastereomerism R/S and E/Z nomenclature).

## Absorption Spectroscopy UV –

Chromophore, auxochrome, bathochromic and hypsochromic shift effect of conjugation and stability on $\lambda_{max}$ Woodward - Fieser rule for calculation of $\lambda_{max}$ of polyenes. IR: Absorption frequency of Various functional groups and factor on which V – max depend.

## Structure of atom –

Bohr's model, Quantum numbers and modern atomic theory.

## Periodic properties –

Atomic and ionic radii, ionization potential, electron affinity, electronegativity, lattice energy, hydration energy and their relation to solubility of ionic compounds.

## Chemical bonding –

Ionic, covalent, coordinate and hydrogen bonding. Shape of molecules.

## Coordination chemsity –

3-d block elements, nomenclature of complexes, ligands (monodentate, bidentate, polydentate), Werner theory and valence bond theory. Biologically active coordination compounds (haemoglobin, myoglobin, vitamin $B_{12}$, Chlorophyll)

## Oxidation and Reduction –

Oxidation number redox reaction and standard electrode potential of half cell and its application in inorganic chemistry.

## Radioactivity: -

Natural radioactivity, radioactive decay, properties of α, β and γ Rays, half- life period, nuclear fission and nuclear fusion.

## Chemical kinetics and catalysis –

Molecularity, order of reaction, examples of zero, first and second order reaction, examples of catalytic and enzymatic reactions.

## Thermodynamics :

First and second law of thermodynamics, enthalpy of a system and capacity at constant volume and pressure, relation between $C_p$ and $C_v$. Extensive and Intensive properties.

## Chemical equilibrium –

Law of masses action, Le–Chatelier principle and its application degree of dissociation, relation between Kp and Kc activity and activity coefficient.

## Ionic Equilibrium –

Dissociation of week acid (Ka) and week base (Kv), hydrolysis of salts of week acid and weak base, strong acid - weak base and weak acid – strong solubility and solubility product. Dissociation constant of water (Kw), buffer solution and pH of the buffer solution.