SRSMT Scholarship Test-2025 Syllabus

(Non-Medical)

PHYSICS

1. **Measurement:** Units and dimensions, least count, significant figures and error analysis.

2. **Mechanics**: Kinematics in one and two dimensions, Circular motion, Relative velocity, projectiles, Newton's laws of motion; Inertial and noninertial frames of reference; Friction, Kinetic and potential energy, Work and power, Conservation of linear momentum and mechanical energy, Centre of mass and its motion, Impulse, Law of gravitation, Gravitational potential and field, Acceleration due to gravity, Rigid body, moment of inertia,

3. **Properties of Bulk Matter:** Hooke's law, Young's modulus, Pascal's law, Buoyancy, Surface energy and surface tension, Viscosity, Stoke's law, Terminal velocity, Streamline flow, Bernoulli's theorem

4. **Waves and Oscillations:** Wave motion, longitudinal and transverse waves, Superposition of waves, progressive and stationary waves, Resonance, Beats, Speed of sound in gases, Simple harmonic motions.

5. **Optics**: Reflection and refraction, Total internal reflection; dispersion, mirrors and lenses, Huygen's principle, Young's double-slit experiment.

6. **Heat and Thermodynamics**: Thermal expansion; Calorimetry, latent heat; Heat conduction, Newton's law of cooling; Ideal gas laws, Specific heats, Isothermal and adiabatic processes, Equivalence of heat and work, First law of thermodynamics.

7. **Electricity and Magnetism**: Coulomb's law; Electric field and potential, Gauss's law, Ohm's law, Resistors and Capacitors in series and parallel, Energy stored in a capacitor, Kirchhoff's laws, Heating effect of current, Biot-Savart law and Ampere's law, Force on a moving charge and on a current carrying wire in a uniform magnetic field, Magnetic moment of a current loop, Faraday' s law, Lenz's law, Self and mutual inductance, Electromagnetic waves, Displacement current.

8. **Modern Physics**: Atomic nucleus, Alpha and beta particles, gamma radiation; Law of radioactive decay, Fission and fusion processes, Photoelectric effect,Characteristic and continuous X-rays, de Broglie wavelength of matter waves.

CHEMISTRY

1. **Atomic Structure:** Dual nature of matter and radiation, Heisenberg uncertainty principle, quantum mechanical model of atom (quantum designation of atomic orbitals and electron energy in terms of principal, angular momentum and magnetic quantum numbers), electronic spin and spin quantum numbers, Pauli's exclusion principle, *Aufbau* principle, Hund's rule, atomic orbitals and their pictorial representation, electronic configurations of elements.

2. **Classification of elements and periodicity in properties:** Modern periodic law and present form of periodic table, electronic configurations of elements and periodic table, electronic configuration and types of elements.

3. **Chemical bonding:** Kossel -Lewis approach to chemical bond formation, ionic bonds, covalent bonds, polarity of bonds and concept of electronegativity, valence shell electron pair repulsion (VSEPR) theory, shapes of simple molecules, valence bond theory, hybridization involving s, p and d orbitals and shapes of molecules σ and π bonds, Hydrogen-bonding.

4. **Ionic equilibrium and Redox reactions:** Acids, Bases and Salts and their ionization, weak and strong electrolytes degree of ionization and ionization constants, concept of pH, ionic product of water, Electronic concepts of reduction - oxidation, redox reactions, oxidation number, balancing of redox reactions.

5. **Solutions:** Vapour pressure of solutions and Raoult's Law, Colligative properties, lowering of vapour pressure, depression of freezing point, elevation of boiling points and osmotic pressure, d

6. **Electrochemistry:** Conductance in electrolytic solutions, specific and molar conductivity, variation of conductivity with concentration, electrolysis and laws of electrolysis, electrolytic and galvanic cells, emf. of a cell, standard electrode potential, Nernst equation.

7. **Coordination Compounds:** Basic ideas of Crystal Field Theory, colour and magnetic properties.

8. **Some basic principles of Organic Chemistry:** inductive effect, electromeric effect, resonance and hyperconjugation. Common types of organic reactions: substitution, addition, elimination and rearrangement reactions.

9. **Hydrocarbons:** Alkanes, Alkene and Alkynes: classification, nomenclature and important reactions. Aromatic hydrocarbons: structure and chemical reaction of benzene,IUPAC Nomenclature.

10. **Organic compounds with functional groups:** Relative reactivity and properties of Alcohols and phenols.

MATHEMATICS

1. **Complex Numbers:** Solution of the quardratic equations. Algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system. Square root of a complex number.
2. **Continuity and Differentiability:** Inverse of a function, Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms.

3. **Applications of Derivatives:** Rate of change of bodies, increasing/decreasing functions, maxima and minima.

4. **Integration:** Integration of a variety of functions by substitution, by partial fractions and by parts, Fundamental Theorem of Calculus, Basic properties of definite integrals and evaluation of definite integrals.

5. **Applications of the Integrals**: Applications in finding the area under simple curves.

6. **Differential Equations:** Order and degree. General and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations of first order and first degree by method of separation of variables of homogeneous differential equations. Solutions of linear differential equation of order one.

7. **Probability:** Conditional probability, multiplication theorem on probability, independent events, total probability, Baye's theorem.

8. **Matrices and Determinants:** Matrix operations (Addition, multiplication and scalar multiplication of matrices), Inverse of a matrix, Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations

9. **Vector Algebra:** Properties and applications of scalar(dot) product of vectors, vector (cross) product of vectors.

ENGLISH

1. Grammar: Agreement, Time and Tense, Parallel construction, Relative pronouns, Determiners, Prepositions, Modals, Adjectives, Voice, Transformation, Question tags, Phrasal verbs.
2. Vocabulary: Synonyms, Antonyms, Odd Word, One Word, Jumbled letters, Homophones, Spelling,Contextual meaning, Analogy.
3. Reading Comprehension: Content/ideas, Vocabular, Referents, Idioms/Phrases, Reconstruction (rewording).
4. Composition: Rearrangement, Paragraph Unity, Linkers/Connectives.

GENEREL KNOWLEDGE

1. Last 1 Year Current Affairs of National and International level in India and its neighboring countries.