Pharmacy Entrance Exam Syllabus

Subjects: Physics, Chemistry, Biology, Mathematics

PHYSICS SYLLABUS

• Electric Charges and Fields
Electric charges, Coulomb's law-force between two-point charges; Electric field, Statement of Gauss's theorem and its applications, Electric potential, potential difference, Conductors and insulators.

• Current Electricity
Current, flow of electric charges in a metallic conductor, drift velocity, Ohm's law, V-I characteristics (linear and non-linear), electrical energy and power, Kirchhoff's rules, Wheatstone bridge.

• Moving Charges and Magnetism
Concept of magnetic field, Biot - Savart law and its application to current carrying circular loop, Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors-definition of ampere.

• Magnetism and Matter
Bar magnet, magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only).

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

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

• Ray Optics and Optical Instruments
Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers, Optical instruments: Microscopes.

• Wave Optics
Wave front and Huygen’s principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygen’s principle.

• Atoms and Nuclei
Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom. Nuclei: Composition and size of nucleus, nuclear force, Mass-energy relation.

• **Semiconductor Electronics: Materials, Devices and Simple Circuits**

Energy bands in conductors, semiconductors and insulators, Intrinsic and extrinsic semiconductors-p and n type, p-n junction, application of junction diode -diode as a rectifier.

CHEMISTRY SYLLABUS

• **Solid State**

Classification of solids based on different binding forces: molecular, ionic covalent and metallic solids, amorphous and crystalline solids (elementary idea),

• **Solutions**

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties – relative lowering of vapour pressure, Raoult's law, elevation of B.P., depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties,

• **Electrochemistry**

Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; Nernst equation and its application to chemical cells, corrosion.

• **Chemical Kinetics**

Rate of a reaction (average and instantaneous), factors affecting rates of reaction: concentration, temperature, catalyst; order and molecularity of a reaction; rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions), Arrhenius equation.

• **Surface Chemistry**

Adsorption – physisorption and chemisorption; factors affecting adsorption of gases on solids; catalysis: homogenous and heterogeneous, activity and selectivity: enzyme catalysis; colloidal state: distinction between true solutions, colloids and suspensions; lyophilic, lyophobic; electrophoresis, coagulation; emulsions – types of emulsions.

• **p-Block Elements**

Group 15 elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen – preparation, properties and uses;
Group 16 elements: General introduction, electronic configuration, oxidation states, (structures only).
Group 17 elements: General introduction, electronic configuration, oxidation states, (structures only).
Group 18 elements: General introduction, electronic configuration, occurrence, trends in physical and chemical properties, uses.

• **d and f Block Elements**

General introduction, electronic configuration, occurrence and characteristics of transition metals,

• **Coordination Compounds**

Coordination compounds: Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds, bonding

• **Halo alkanes and Haloarenes**

Halo alkanes: Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions. Optical rotation.

Haloarenes: Nature of C-X bond, substitution reactions (directive influence of halogen for mono substituted compounds only). Uses and environmental effects of – dichloromethane, tri chloromethane, tetra chloromethane, iodoform, freons, DDT.

• **Alcohols, Phenols and Ethers**

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); identification of primary, secondary and tertiary alcohols;

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols.

Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

• **Aldehydes, Ketones and Carboxylic Acids**

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, and mechanism of nucleophilic addition,

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

• **Biomolecules**

Carbohydrates – Classification (aldoses and ketoses), monosaccharide (glucose and fructose), D-Configuration, oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen): importance.

Proteins - Elementary idea of a - amino acids, peptide bond, polypeptides, proteins, primary structure, secondary structure, tertiary structure and quaternary structure (qualitative idea only), denaturation of proteins;

Vitamins – Classification and functions.

Nucleic Acids: DNA and RNA

• **Polymers**

Classification – Natural and synthetic, methods of polymerization (addition and condensation), copolymerization. Some important polymers: natural and synthetic like polythene, nylon, polyesters, Bakelite, rubber. Biodegradable and non-biodegradable polymers.

• **Chemistry in Everyday Life**

• Chemicals in medicines – analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.

• Chemicals in food – preservatives, artificial sweetening agents, elementary idea of antioxidants.

• Cleansing agents – soaps and detergents, cleansing action.

BIOLOGY SYLLABUS

• Biology and its branches, Relationship with other branches of science, historical aspect, Indian concepts, importance and future.
• Characteristics of living beings, Origin of life theories, classification (five kingdom), structure of virus and bacteria.
• Cell discovery, cell theory, prokaryotic and eukaryotic structure, unicellular/multicellular, organelles (nucleus, mitochondria, ribosome, Golgi body).
• Biomolecules – water, salts, carbohydrates, lipids, proteins, enzymes, nucleic acids, vitamins, hormones, steroids.
• Cell division – amitosis, mitosis, meiosis; chromosome structure and function; gene mapping and recombination.
• Human genetics – DNA structure, replication, transcription, translation, gene regulation, genomics, cloning, DNA fingerprinting.
• Plant morphology – root, stem, leaf, flower structure and types, floral formula and diagrams.
• Plant anatomy – tissues, monocot/dicot anatomy, secondary growth.
• Animal morphology – earthworm, cockroach, rat; animal tissues and their structure/function.

MATHEMATICS SYLLABUS

• **Matrices** – Types, elementary operations
• **Determinants** – Adjoint and inverse
• **Applications of Derivatives** – Tangents, normals, maxima and minima
• **Integrals** – Indefinite and definite integrals
• **Differential Equations** – General and specific solutions
• **Probability** – Random variables, distributions
• **Relations and Functions** – One-to-one, onto, binary operations