

PART (G) PHARMACIST & CHEMIST

UNIT-1

BIOLOGY

- Cell: The Unit of life, Cell Cycle and cell division.
- Origin of Life, Evidences and Theories of Biological Evolution. Human Evolution.
- Biomolecules (Proteins, Carbohydrates and Lipids). Vitamins. Enzymes and Enzyme action. Metabolism (Glycolysis, Glycogenesis and Glycogenolysis, Amino acid and Lipid metabolism).
- Mendelian laws of Inheritance. Human Genetics (Mendelian disorders, Chromosomal abnormalities). Molecular basis of inheritance (Genes, Nucleic acids, Replication of DNA, Gene Expression and regulation).
- Bacteria, Viruses, Viroids and Prions. Systematics, Salient features, Structure and economic importance.
- Classification of Plant Kingdom up to orders. Salient features and economic importance of various groups.
- Herbal drugs and indigenous system of medicine. Brief outline of occurrence distribution, isolation, identification tests, therapeutic effects and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.
- Animal Kingdom: Classification of various Phyla up to Classes, typical examples and economic importance.
- Human Anatomy and Physiology: Scope of Anatomy and physiology, Elementary tissues, Skeleton System, Cardiovascular System, Respiratory System, Urinary System, Muscular System, Central Nervous System, Sensory Organs, Digestive System, Endocrine System & Reproductive System.
- Human health diseases, Concept of health, Nutrition and health, Demography and family planning, First aid, Environment and health. Microbes and human welfare. Fundamental principles of microbiology, Classification of microbes, Isolation, Staining, Techniques of organisms of common diseases. Communicable diseases, Respiratory infections (Chicken pox, measles, diphtheria, tuberculosis and whooping cough). Poliomyelitis, Hepatitis, Cholera, Typhoid, Plague, Malaria, Rabies, Tetanus, Leprosy, Sexually Transmitted diseases. Immunity and immunization. Therapeutics (Introduction of pathology of blood and urine. Lymphocytes and platelets, their role in health and diseases. Erythrocytes-Abnormal cells and their significance. Abnormal constituents of urine and their significance in disease).
- Principles, processes and applications of Biotechnology.
- Ecology and Environment: Abiotic factors - Climatic, topographic, atmospheric and edaphic factors, Biotic factors. Biodiversity and its conservation (Environmental laws and Protected Areas). Environmental pollution (types and control).

UNIT-2

CHEMISTRY

- Structure of Atom & Periodic Properties: Bohr's atomic model. de Broglie's equation. Heisenberg's uncertainty principle, concept of orbitals, Quantum numbers. Aufbau principle, Pauli's exclusion principle and Hund's rule. Electronic configuration of atoms. Modern periodic law. Periodic table, periodic properties.

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- Basics of Bonding: Covalent bond, Valence bond theory, VSEPR theory, Concept of Hybridization, Structure of simple molecules. Molecular orbital theory, Bond order, Electronic configuration of homonuclear diatomic molecules (H_2 , He_2 , C_2 , N_2 & O_2). Hydrogen bonding.
- Common compounds used in Pharmaceutical Chemistry: Antioxidants (Hypophosphorus acid, SO_2 , Sodium bisulphite, Nitrogen and Sodium nitrite), Gastrointestinal agents (Antacids & Saline Cathartics-Kaoline and Bismuth subcarbonate), Topical agents (Talc, ZnO , Calamine, Zinc stearate, TiO_2 , Silicone polymers, H_2O_2 , $KMnO_4$, Iodine, Borax, Silver nitrate, Mercury yellow, Sublimed Sulphur, Selenium sulphide & Alum), Dental Products (Sodium fluoride, Calcium carbonate, Dicalcium phosphate & Zinc chloride), Antidotes (Sodium nitrite).
- General Organic Chemistry: Classification of organic compounds, IUPAC Nomenclature. Isomerism. General organic reaction, Attacking reagents (Electrophile & Nucleophile), Reaction intermediates (Carbocation, Free radical and Carbanion). Factors affecting reactivity of organic substrate (Inductive effect, Electromeric effect, Hyperconjugation & Resonance effect). Types of organic reactions and Mechanism. Methods of Purification of Organic Compounds. Qualitative and Quantitative analysis of Organic Compounds.
- Basic Organic Compounds: Method of preparation of alkanes, alkenes & alkynes. Aromaticity, Mechanism of Electrophilic Substitution reactions (Nitration, Sulphonation, Halogenation and Friedel Craft's alkylation & acylation). General methods of preparation, Physical & Chemical properties of haloalkenes, haloarenes, alcohol, phenol, aldehyde, ketones, acid, acid derivatives and amines.
- Common Name Reactions: (Hunsdieker reaction, Hoffmann Ammonolysis, Wurtz reaction, Sandmeyer reaction, Gattermann reaction, Esterification reaction, Reimer Teimann reaction, Aldol Condensation, Cannizaro reaction, Benzoin Condensation, Carbyamine reactions).
- Equilibrium: Equilibrium constant. Le Chatelier's principle. Ionization of acid and base. Strong and weak electrolytes. pH, Buffer solutions. Common acid and bases used in pharmacy-Boric acid, HCl , NH_4OH , $NaOH$ and Standard buffer solutions.
- Electrochemistry: Method of expression of concentration. Electrolysis. Galvanic Cell, EMF of cell, Standard electrode potential, Nernst equation. Pharmaceutical use of Electrolytes-Electrolytes used in Replacement therapy ($NaCl$ & KCl). Physiological acid-base balance and electrolytes used-Sodium acetate, Potassium acetate, Sodium bicarbonate, Sodium citrate, etc.
- Adsorption: Factor affecting adsorption. Colloids, Types of Colloids. Properties of Colloids. Emulsions.
- Radio Pharmaceutical: Radioactivity, Biological effects of radiations. Measurement of radioactivity. Use of $BaSO_4$.

UNIT-3

PHARMACY

- Basic knowledge of pharmaceutical terms like Pharmaceutics, Pharmacognosy, Pharmacology and Pharmacotherapeutics.
- Microscopy, Sterilization, different staining techniques, biochemical test (Blood Glucose, Blood Urea, Serum Uric Acid).
- Pharmaceutics: Basic knowledge and skills on the art and sciences of formulating and dispensing different pharmaceutical dosage forms.
- Substances used as drugs and pharmaceuticals for various disease conditions. Antibiotics, Anti-neoplastic agents, Analgesics and Anti-infective agents.

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- Status and scope of pharmacognosy.
- WHO, Public and private health system in India, National Health Mission, Balanced Diet, Nutrition deficiency diseases.
- Narcotics, cytotoxic drugs, Pediatrics, Geriatrics, Anti-natal care, Post-natal care.

UNIT-4

- Pharmacology: Basic knowledge about different classes of drugs available for the pharmacotherapy of common diseases.
- Pharmacokinetics, Pharmacodynamics, routes of drug administration.
- Autocoids, Chemo-therapeutic agents, Biologicals (Definition, type and indication of biological agents with examples)
- Definition, history and development of community pharmacy, International and national scenarios.
- Organ function test (Kidney function Test, Liver Function Test, Lipid Profile)
- Basic Knowledge of etiopathogenesis of common diseases and their management along with quality use of medicines.
- Pharmaceutical legislation of India.

Note: Current knowledge of Scientific Advancements related to all the above units is deemed to have been included.

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