

UNIT-I

- a) The physical, physico-chemical and engineering principles governing design, layout and operation of plants for the process employed in pharmaceutical industry.
- b) Unit operations: size reduction, size separation, mixing, compression, filtration, centrifugation, extraction, evaporation, drying, distillation, crystallization.
- c) Industrial Hazards and Safety Precautions: Mechanical, Chemical, Electrical, Fire and Dust hazards, Industrial dermatitis, Accident records
- d) Containers, closures and packaging materials
- e) Preformulation Studies
- f) Pharmaceutical excipients: Antioxidants, preservatives, Colouring, Flavouring and Sweetening agents, Solvents.
- g) Facts related with formulation:- Physical properties, particle size. Crystal form, flow cohesiveness. Solubility. Chemical properties, Hydrolysis. Oxidation racemization, enzymatic decompositions.
- h) pH determination, application, buffer equation, buffer capacity, buffered isotonic solutions; Micrometrics: Particle size determinations, derived properties of powders; Interfacial phenomenon : HLB values surfactants, factors influencing interfacial phenomenon, Critical micellar concentration, Electrical properties at interface; Coarse dispersions: Suspensions and emulsions, Theories of emulsification, multiple emulsions.
- i) Pharmaceutical calculations: Calculations of doses, alcohol dilutions, proof spirit, isotonic solutions.
- j) Nuclear Pharmacy- Introduction to Radiopharmaceuticals, radioactive half-life, units of radioactivity. Production of radiopharmaceuticals, methods of isotopic tagging, preparation of radioisotopes in laboratory using radiation dosimetry and radioisotope generators. Permissible radiation dose level, radiation hazards, their prevention and specifications for radioactive laboratory.
- k) Good Manufacturing Practice

- l) Quality control, of the following formulations: Semisolids, Solid dosage forms, Liquid dosage forms, Parenteral and ophthalmic preparations
- m) New Drug Delivery Systems- Aerosols, Ocusert, Transdermal Drug Delivery Systems, Osmotic Drug Delivery Systems, Targeted Drug Delivery Systems, Prolonged Drug Delivery Systems
- n) Cosmetics- Dentifrices, Lipsticks, Face powders, shampoos, depilatories and Manicure preparations

UNIT-II

- a) **Blood Products and Plasma Substitutes:** Collection, processing and storage of whole human blood, concentrated human RBCs, dried human plasma, human fibrinogen, human thrombin, human normal immunoglobulin, human fibrin foam, plasma substitutes, ideal requirements of PVP, dextran, etc. Control of blood products as per IP.
- b) Basics of pharmacokinetic studies and their importance
- c) Pharmaceutical Biotechnology- General principles of immunology, immunological techniques used in pharmacy; Sterilization of different pharmaceutical dosage forms; Sterility Testing; Methods of preparation of official sera and vaccines; Microbiological assays of antibiotics and vitamins of the pharmacopeia; Disinfectants- Classification, Mechanism and uses of disinfectants in brief. Factors affecting disinfection and methods of disinfectant evaluation.
- d) Immunologicals: Preparation and quality control of products representing various categories like

Toxoids	– Diphtheria and Tetanus,
Live Bacterial Vaccines	– BCG
Killed Bacterial Vaccines	– Cholera, DPT.
Viral Vaccines	– Polio, Rabies and small pox
Antitoxins	– Diphtheria

UNIT III

- a) Chemistry of Alkaloids, Vitamins, Flavanoids, Glycosides, steroids, terpenes, vitamins and hormones.

- b) Catalytic hydrogenation, dehydrogenation, metal hydride reduction. Reduction with hydrazine and its derivatives, Birch reduction, Clemenson's reduction, Meerwin – Ponndrof reduction, oxidation with periodic acid, lead tetra acetate, mercuric acetate and selenium oxide. Beckmann rearrangement, Schmidt rearrangement and Darzen's reaction.

UNIT IV

Synthesis, properties, test for purity, storage of the following categories of drugs - Analgesics and Antipyretics, Anti-inflammatory, Hypnotics and sedatives, Anti convulsants, Anti-psychotics, Anti-histamines, Sympathomimetics, Adrenergic antagonists, Cholinomimetics and anti-cholinergic, Local Anaesthetics, Anti-hypertensives, Anti-anginal, Sulphonamides, antibiotics, Anti-TB, Anti-Viral, Anti-Fungal, Antimalarials, Anti-Neoplastics,

UNIT-V

- a) Principles and Pharmacopeial Assay Procedures involving Non-aqueous Titration, Oxidation-Reduction, Diazotization, complexometric methods, electrometric titration, gravimetric analysis
- b) Polarimetry and refractometry, and gasometric analysis of oils, fats and waxes
- c) Chromatography- TLC, Column, Paper, GC, Ion exchange, HPLC, HPTLC, Gel electrophoresis,
- d) Theory, principle, instruments and applications of colorimetry, UV- Visible Spectrometry, Fluorimetry, Nephelometry, Turbidometry, IR, Mass, NMR, RIA.

UNIT-VI

- a. General Pharmacology:- Routes of administration, Absorption, distribution, Biotransformation and Excretion of drugs, Bioavailability and bio equivalence, Factors affecting bioavailability, Mechanism of action of drugs at receptor level, adverse drug reaction;
- b. Drugs acting on Central Nervous system: Analgesics, Nonsteroidal anti inflammatory drugs, Sedatives and Hypnotic, Anti convulsants and Antipsychotic drugs. Drugs used in parkinsonism.

- c. Drugs acting on Autonomic Nervous system: Drugs which influence the working of autonomic nervous system, Adrenergic drugs (or) sympathomimetic drugs, Adrenergic blocking drugs, Cholinergic drugs and cholinergic blocking drugs, Drugs acting on autonomic ganglia.
- d. Drug acting on cardiovascular system: cardiac glycosides, Anti hypertensive, anti arrhythmic and anti anginal drugs.
- e. Diuretics & anti diuretics

UNIT-VII

- a. Drugs acting on GIT
- b. Insulin and oral anti diabetic drugs, Thyroid and anti-thyroidal drugs, oral contraceptives. Hormone replacement therapy, drugs acting on uterus.
- c. Antihistaminic drugs and Drugs used in Migraine
- d. Chemotherapy- sulphonamides penicillins, cephalosporins, quinolones, Tetracyclines, Aminoglycosides, Chemotherapy of Tuberculosis, leprosy, malaria, cancer , Ameobiasis, Helminthiasis.
- e. Toxicology- Systematic & local treatment of poisoning and their treatment.

UNIT-VIII

- a. General principles of cultivation and collection of drugs from wild & cultivated sources, their merits and demerits, factors affecting cultivation, adulterants and their detection
- b. Plant growth regulators
- c. Source, synonym, cultivation, collection, preparation for market, diagnostic characters (both macroscopical and microscopical). Constituents, substitutents, adulterants and uses of Cinnamon, Cinchona, Senna, digitalis, Clove, Saffron, Pyrethrum. Cochineal, Ergot, opium, Aloe, Acacia, Tragacanth, Benzoin, Ginseng, Brahmi, Dioscorea, Cascara, Gelatin, umbelliferous fruits, spirulina, nuxvomica, ginseng, belladonna, taxol , vinca.
- d. Principle and application plant tissue culture.
- e. Basics of fermentation technology & production of Antibiotics, Vitamins.

UNIT-IX

- a. Biosynthetic pathways of Tropane alkaloids, Cholesterol, amino acids.
- b. WHO Guidelines for herbal medicines

UNIT-X

- a. Drugs and Cosmetics Act 1940 and Rules 1945
- b. Pharmacy Act 1948