Section A: PHARMACEUTICS


4. Pharmaceutical Technology: Principles, Formulation, Ingredients, method of manufacture, evaluation, quality control tests, labeling and packaging of following class of product:
   Solid dosage forms- Tablets, coating, capsules, microcapsules, powders, granules etc.
   Liquid dosage forms- solutions, suspensions, emulsions,
   Semisolid dosage forms- ointment, creams, gels, suppositories,
   Parenterals- injections small volume, large volume, ophthalmic preparations and Pre-formulation studies, Stability studies and Pharmacopoeal specifications for various formulations.
   Formulation of cosmetics preparation like lipstick, shampoo, creams, nail preparations and dentifrices, powers etc.


   Bioavailability and bioequivalence: Measures of bioavailability, Cmax, tmax, K_el and Area Under the Curve (AUC); Review of regulatory requirements for conducting bioequivalent studies. Biopharmaceutical Classification System (BCS) of drugs.
Section B: PHARMACEUTICAL ANALYSIS AND QUALITY ASSURANCE

1. Fundamental of pharmaceutical analysis, Theoretical consideration and application in drug analysis and quality control.
   Acid base titrations: Acid base concepts, ionization, law of mass action, common ion effect, ionic product of water, pH, hydrolysis of salts, Henderson- Hasselbach equation, buffer solutions, neutralization curves, acid-base indicators, theory of indicators, choice of indicators, mixed indicators, polyprotic systems, polyamine and amino acid systems, amino acid titrations.
   Complexometric titrations: Complexing agents used as titrants, indicators, types of complexometric titrations, masking and demasking;
   Non-aqueous titrations: Acidic and basic drugs, solvents used, indicators
   Gravimetry: Precipitation techniques, colloidal state, supersaturation, co-precipitation, post-precipitation, digestion, washing of the precipitate, thermogravimetric curves.
   Potentiometry: Electric potential, electrochemical cell, reference electrodes, indicator electrodes, measurement of potential and pH, construction and working of electrodes, potentiometric titrations, method of deduction of end-point.
   Conductometry: Conductance, conductivity cell, conductometric titrations, applications.
   Polarography: Instrumentation, DME, residual current, diffusion current and limiting current, polarographic wave, Ilkovic’s equation, effect of oxygen on polarographic wave, polarographic maxima and suppressors, applications.
   Amperometry: Introduction, types of electrodes used, reference and indicator electrode, instrumentation, titration procedure, advantages and disadvantages of amperometry over potentiometry, pharma applications.

2. Chromatographic methods of pharmaceutical analysis:
   Principles of separation, theory, instrumentation and applications of Column chromatography, Paper chromatography, Ion Exchange chromatography, TLC & HPTLC, HPLC and Gas chromatography.

3. Instrumental methods of pharmaceutical analysis:
   Theoretical aspects, basic instrumentation, elements of interpretation of spectra, and applications (quantitative and qualitative) of Ultraviolet and Visible spectrophotometry, Fluorimetry, Infrared spectrophotometry, Nuclear Magnetic Resonance spectroscopy [proton technique only], Mass Spectrometry (EI & CI only), Flame Photometry, Atomic Absorption Spectroscopy, X-ray Diffraction Analysis, Thermal methods(TGA,DSC,DTA), Radioimmunoassay.

4. Quality assurance:
   GLP, ISO 9000, TQM, Validation, quality audit, quality of equipment, validation of equipment and validation of analytical procedures.

2. Fundamentals of general pharmacology: Dosage forms and routes of administration, mechanism of action, combined effect of drugs, factors modifying drug action, tolerance and dependence; Pharmacogenetics; Principles of Basic and Clinical pharmacokinetics, absorption, Distribution, Metabolism and Excretion of drugs, Adverse Drug Reactions; Bioassay of Drugs and Biological Standardization; Discovery and development of new drugs, Bioavailability and bioequivalence studies;


5. Pharmacology of Cardiovascular System: Drugs used in the management of congestive cardiac failure, Antihypertensive drugs, Anti-anginal and Vasodilator drugs, including calcium channel blockers and beta adrenergic antagonists, Antiarrhythmic drugs, Anti-hyperlipedemic drugs, Drugs used in the therapy of shock.


7. Drugs acting on urinary system: Fluid and electrolyte balance, Diuretics. Anti diuretics.


9. Drugs Acting on the Respiratory System:
Anti-asthmatic drugs including bronchodilators, Anti-tussives and expectorants, Respiratory stimulants.

10. Drugs acting on the Gastrointestinal Tract:
Antacids, Anti-secretory and Anti-ulcer drugs, Laxatives and anti-diarrhoeal drugs, Appetite Stimulants and Suppressants, Emetics and anti-emetics, Miscellaneous: Carminatives, demulcents, protectives, adsorbents, astringents, digestants, enzymes and mucolytics.

11. Pharmacology of Endocrine System:
Hypothalamic and pituitary hormones, Thyroid hormones and anti-thyroid drugs, parathormone, calcitonin and Vitamin D, Insulin, glucagons, incretins, oral hypoglycemic agents and insulin analogs, ACTH and corticosteroids, Androgens and anabolic steroids, Estrogens, progesterone and oral contraceptives, Drugs acting on the uterus.

12. Chemotherapy: General Principles of Chemotherapy, Bacterial resistance; Sulfonamides and cotrimoxazole, Antibiotics- Penicillins, Cephalosporins, Aminoglycosides, Chloramphenicol, Macrolides, Tetracyclines, Quinolones, fluoroquinolones and Miscellaneous antibiotics; Chemotherapy of tuberculosis, leprosy, fungal diseases, viral diseases, HIV and AIDS, urinary tract infections and sexually transmitted diseases, malaria, amoebiasis and other protozoal infections and Anthelmentics. Chemotherapy of malignancy and immunosuppressive agents.

13. Principles of Toxicology: Definition of poison, general principles of treatment of poisoning with particular reference to barbiturates, opioids, organophosphorous and atropine poisoning, Heavy metals and heavy metalantagonists.
Section D: PHARMACEUTICAL CHEMISTRY


5. Pharmacognosy:

   a. Systematic pharmacognostic study of the followings:

   Carbohydrates and derived products: Agar, guar gum, acacia, Honey, Isabagol, pectin and Tragacanth.

   Lipids: Bees wax, Castor oil, Codliver oil, Shark liver oil and Wool fat.

   Resins: Colophony, podophyllum, jalap, cannabis, capsicum, myrrh, asafoetida, balsam of Tolu, balsam of Peru, benzoin, turmeric, ginger.
Volatile oils: Mentha, Coriander, Cinnamon, Cassia, Lemon peel, Orange peel, Lemon grass, Citronella, Caraway, Dill, Clove, Fennel, Nutmeg, Eucalyptus, Chenopodium, Cardamom, Sandal wood.

Fibers: Cotton, silk, wool, nylon, glass-wool.

b. Study of the biological sources, cultivation, collection, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following groups of drugs.


c. Enzymes: Diastase, papain, pepsin, trypsin, pancreatin.

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