

SECTION II

PHARMACEUTICAL CHEMISTRY

1. **Impurities in Pharmaceuticals:** Source and effect of impurities in Pharmacopoeial substances, importance of limit test, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals and arsenic
2. **Inorganic Pharmaceuticals:** Pharmaceutical formulations, market preparations, storage conditions and uses of
 - **Haematinics:** Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron
 - **Gastro-intestinal Agents:** Antacids: Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics.
 - **Topical agents:** Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate.
 - **Dental products:** Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes.
 - **Medicinal gases:** Carbon dioxide, nitrous oxide, oxygen.
 - Introduction to nomenclature of organic chemical systems with particular reference to heterocyclic compounds containing up to Three rings
- **Study of the following category of medicinal compounds with respect to classification, chemical name, uses, stability and storage conditions, different types of formulations and their popular brand names**
 - **Drugs Acting on Central Nervous System:**
 - Anaesthetics:** Thiopental Sodium, Ketamine Hydrochloride Propofol.
 - Sedatives and Hypnotics:** Diazepam, Alprazolam, Nitrazepam, Phenobarbital.
 - Antipsychotics:** Chlorpromazine Hydrochloride, Haloperidol, Risperidone, Sulpiride, Olanzapine, Quetiapine, Lurasidone.
 - Anticonvulsants:** Phenytoin, Carbamazepine, Clonazepam, Valproic Acid, Gabapentin, Topiramate, Vigabatrin, Lamotrigine.
 - Anti-Depressants:** Amitriptyline Hydrochloride, Imipramine Hydrochloride, Fluoxetine, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram, Fluvoxamine, Paroxetine
 - **Drugs Acting on Autonomic Nervous System: Sympathomimetic Agents:**
 - Direct Acting:** Nor- Epinephrine, Epinephrine, Phenylephrine Dopamine, Terbutaline, Salbutamol (Albuterol), Naphazoline, Tetrahydrozoline.
 - Indirect Acting Agents:** Hydroxy Amphetamine, Pseudoephedrine. Agents With Mixed Mechanism: Ephedrine, Metaraminol
 - Adrenergic Antagonists:** Alpha Adrenergic Blockers: Tolazoline, Phentolamine Phenoxylbenzamine, Prazosin. Beta Adrenergic Blockers: Propranolol, Atenolol, Carvedilol,

Cholinergic Drugs and Related Agents: Direct Acting Agents: Acetylcholine, Carbachol, And Pilocarpine. Cholinesterase Inhibitors: Neostigmine, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide,

Cholinergic Blocking Agents: Atropine Sulphate, Ipratropium Bromide,

Synthetic Cholinergic Blocking Agents: Tropicamide, Cyclopentolate Hydrochloride, Clidinium, Bromide, Dicyclomine Hydrochloride,

- **Drugs Acting on Cardiovascular System: Anti-Arrhythmic Drugs:** Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium, Lidocaine Hydrochloride, Lorcaïnide Hydrochloride, Amiodarone and Sotalol,
- **Anti-Hypertensive Agents:** Propranolol, Captopril, Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine, **Antianginal Agents:** Isosorbide Dinitrate,
- **Diuretics:** Acetazolamide, Frusemide, Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone
- **Hypoglycemic Agents:** Insulin and Its Preparations, Metformin, Glibenclamide, Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins
- **Analgesic and Anti-Inflammatory Agents:** Morphine Analogues, Narcotic Antagonists **Nonsteroidal Anti- Inflammatory Agents (NSAIDs)** - Aspirin, Diclofenac, Ibuprofen, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol, Aceclofenac.
- **Antifungal Agents:** Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole, Itraconazole, Fluconazole, Naftifine Hydrochloride
- **Urinary Tract Anti-Infective Agents:** Norfloxacin, Ciprofloxacin, Ofloxacin, Moxifloxacin,
- **Anti-Tubercular Agents:** INH, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid
- **Antiviral Agents:** Amantadine Hydrochloride, Idoxuridine, Acyclovir, Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir
- **Antimalarials:** Quinine Sulphate, Chloroquine Phosphate, Primaquine Phosphate, Mefloquine, Cycloguanil, Pyrimethamine, Artemisinin
- **Sulfonamides:** Sulfanilamide, Sulfadiazine, Sulfamethoxazole, Sulfacetamide, Mafenide Acetate, Cotrimoxazole, Dapsone
- **Antibiotics:** Penicillin G, Amoxicillin, Cloxacillin, Streptomycin, **Tetracyclines:** Doxycycline, Minocycline, **Macrolides:** Erythromycin, Azithromycin, **Miscellaneous:** Chloramphenicol, Clindamycin

BIO CHEMISTRY AND CLINICAL PATHOLOGY

1. Carbohydrates

- Definition, classification with examples, chemical properties
- Monosaccharides - Structure of glucose, fructose, and galactose
- Disaccharides - structure of maltose, lactose, and sucrose
- Polysaccharides - chemical nature of starch and glycogen

Qualitative tests and biological role of carbohydrates

2. **Proteins**

- Definition, classification of proteins based on composition and solubility with examples
- Definition, classification of amino acids based on chemical nature and nutritional requirements with examples
- Structure of proteins (four levels of organization of protein structure)
- Qualitative tests and biological role of proteins and amino acids

Diseases related to malnutrition of proteins

3. **Lipids**

- Definition, classification with examples
- Fatty acid classification – Based on chemical and nutritional requirements with examples
- Structure and functions of cholesterol in the body
- Lipoproteins - types, composition and functions in the body
- Qualitative tests and functions of lipids

4. **Enzymes**

- Definition, properties and IUB and MB classification
- Factors affecting enzyme activity
- Mechanism of action of enzymes, Enzyme inhibitors
- Therapeutic and pharmaceutical importance of enzymes

5. **Vitamins**

- Definition and classification with examples
- Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins

6. **Metabolism** (Study of cycle/pathways without chemical structures)

- Metabolism of Carbohydrates: Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose level. Diseases related to abnormal metabolism of Carbohydrates
- Metabolism of lipids: Lipolysis, β -oxidation of Fatty acid (Palmitic acid) ketogenesis and ketolysis. Diseases related to abnormal metabolism of lipids such as Ketoacidosis, Fatty liver, Hypercholesterolemia
- Metabolism of Amino acids (Proteins): General reactions of amino acids and its significance– Transamination, deamination, Urea cycle and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, phenylketonuria, alkaptonuria and Jaundice.
- Biological oxidation: Electron transport chain and Oxidative phosphorylation

7. **Minerals**: Types, Functions, Deficiency diseases, recommended dietary requirements

8. **Water and Electrolytes**

- Distribution, functions of water in the body
- Water turnover and balance
- Electrolyte composition of the body fluids, Dietary intake of electrolyte and

Electrolyte balance, Dehydration, causes of dehydration and oral rehydration therapy

9. Organ function tests

- Functions of kidney and routinely performed tests to assess the functions of kidney and their clinical significances
- Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances, Lipid profile tests and its clinical significances

10. Introduction to Pathology of Blood and Urine

- Lymphocytes and Platelets, their role in health and disease
- Erythrocytes - Abnormal cells and their significance, Normal and Abnormal constituents of Urine and their significance

PHARMACOTHERAPEUTICS

Definition, etiopathogenesis, clinical manifestations,

Non – pharmacological and pharmacological management of the diseases associated with:

(a) Cardiovascular System

- Hypertension
- Angina and Myocardial infarction
- Hyperlipidaemia
 - Congestive Heart Failure

(b) Respiratory System

- Asthma, COPD

(c) Endocrine System

- Diabetes, Thyroid disorders - Hypo and Hyperthyroidism

(d) Central Nervous System

- Epilepsy
- Parkinson's disease
- Alzheimer's disease
- Stroke
- Migraine

(e) Gastro Intestinal Disorders

- Gastro oesophageal reflux disease
- Peptic Ulcer Disease
- Alcoholic liver disease

(f) Haematological disorders

- Iron deficiency anaemia
- Megaloblastic anaemia

Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)

(g) Infectious diseases

- Tuberculosis

- Pneumonia
- Urinary tract infections
- Hepatitis
- Gonorrhoea and Syphilis
- Malaria
- HIV and Opportunistic infections
- Viral Infections (SARS, CoV2)

(h) Musculoskeletal disorders

- Rheumatoid arthritis
- Osteoarthritis

(i) Dermatology

- Psoriasis
- Scabies
- Eczema

(j) Psychiatric Disorders

- Depression
- Anxiety
- Psychosis