

## PHARMACEUTICS - II

### DISPENSING PHARMACY

**CHAPTER 1 : Prescriptions** – Reading and understanding of prescriptions; Latin terms commonly used (Detailed study is not necessary); Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing.

**CHAPTER 2 : Incompatibilities in Prescriptions** – Study of various types of incompatibilities-Physical, Chemical & therapeutic.

**CHAPTER 3 : Posology** – Dose and dosage of drugs, Factors influencing dose, Calculations of doses on the basis of age, sex and surface area. Veterinary doses.

### DISPENSED MEDICATIONS

**CHAPTER 4 : Powders** – Types of Powders – Advantages and disadvantages of powders, Granules, Cachets and Tablet triturates. Preparation of different types of powders encountered in prescriptions. Weighing methods, Possible errors in weighing, Minimum weighable amounts and weighing of a material below the minimum weighable amount, Geometric dilution and proper usage and care of dispensing balance.

### LIQUID ORAL DOSAGE FORMS

**CHAPTER 5 : Monophasic** – Theoretical aspects including commonly used vehicles, Essential adjuvants like sterilizers, colourants and flavours, with examples.

Review of the following monophasic liquids with details of formulation and practical methods.

*Liquid for internal administration:* Mixtures and concentrates, Syrups, Elixirs.

**CHAPTER 6 : Liquids for external administration or used on mucus membranes** : Gargles, Mouth washes, Throat-paints, Douches, Ear drops, Nasal drops and Sprays, Liniments, Lotions.

### BIPHASIC LIQUID DOSAGE FORMS

**CHAPTER 7 : Suspensions (elementary study)** – Suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvants used like thickening agents, wetting agents, their necessity and quantity to be incorporated. Suspensions of precipitate forming liquids like tinctures, their preparations and stability. Suspensions produced by chemical reactions. An introduction to flocculated / non-flocculated suspension system.

**CHAPTER 8 : Emulsion** – Types of emulsion, Identification of emulsion systems, Formulation of emulsions, Selection of emulsifying agents, Instabilities in emulsions and preservation of emulsions.

### SEMI-SOLID DOSAGE FORMS

#### CHAPTER 9 :

**(a) Ointments** – Types of ointments, Classification and selection of dermatological vehicles. Preparation and stability of ointments by the following processes:

- (i) Trituration
- (ii) Fusion
- (iii) Chemical reaction
- (iv) Emulsification.

**(b) Pastes** – Differences between ointments and pastes, bases of pastes. Preparation of pastes and their preservation.

(c) **Jellies** – An introduction to the different types of jellies and their preparation.

(d) An elementary study of poultice.

**CHAPTER 10 : Suppositories and Pessaries** – Their relative merits and demerits, Types of suppositories, Suppository bases, classification, Properties, preparation and packing of suppositories. Use of suppositories for drug absorption.

**CHAPTER 11 : Dental and Cosmetic Preparations:** Introduction to Dentifrices, Facial cosmetics, Deodorants, Antiperspirants, Shampoos, Hair dressings and hair removers.

#### STERILE DOSAGE FORMS

**CHAPTER 12 : Parenteral dosage forms** – Definition, General requirements for parenteral dosage form. Types of parenteral formulations, vehicles, adjuvants, processing, personnel facilities and quality control, Preparation of Intravenous fluids and admixtures – Total parenteral nutrition, Dialysis fluids.

**CHAPTER 13 : Sterility testing, Particulate matter monitoring** – Faulty seals – packaging.

**CHAPTER 14 : Ophthalmic Products** – Study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.

## PHARMACEUTICAL CHEMISTRY - II

1. Introduction to the nomenclature of organic chemical systems with particular reference to Hetero-cyclic system containing upto 3 rings.

2. The chemistry of following, Pharmaceutical organic compounds, covering their nomenclature, chemical structure, uses and the important physical and chemical properties ( chemical structure of only those compounds marked with asterisk (\*)).

The stability and storage conditions and the different type of Pharmaceutical formulations of these drugs and their popular brands names.

**Antiseptics and Disinfectants** - Proflavine \*, Benzalkonium chloride, Cetrimide, Chlorocresol\*, Chloroxyline, Formaldehyde solution, Hexachlorophene, Liquified phenol, Nitro furantoin.

**Sulphonamides** - Sulfadiazine\*, Sulfaguanidine\*, Pathaly Sulfathiazole, Succinyl sulfathiazole, Sulfadimethoxine, Sulfamethoxy pyridazine, Sulfamethoxazole, Co-trimoxazole sulfacetamide\*.

**Antileprotic Drugs** - Clofazimine, Thiambutosine, Dapsone\*, Solapone.

**Anti-tubercular Drugs** - Isoniazid\*, PAS\*, Streptomycin, Rifampicin, Ethambutol\*, Thiacetazone, Ethionamide, Cycloserine, Pyrazinamide\*.

**Antiamoebic and Anthelmintic Drugs** - Emetins, Metronidazole\*, Halogenated hydroxyquinolines, Diloxanide furoate, Paromomyin, Piperazine\*, Mebendazole, D.E.C.\*.

**Antibiotics** - Benzyl Penicillin\*, Phenoxy methyl, Penicillin\*, Benzathine Penicillin, Ampicillin\*, Cloxacillin, Carbenicillin, Gentamycin, Neomycin, Erythromycin, Tetracyclin, Cephalaxin, Cephaloridine, Cephalothin, Griseoflavine, Chloramphenicol, Antifungal agents - Undecylenic acid, Tolnaftate, Nystatin, Amphoterecin, Hamycin.

**Antimalarial Drugs** - Chloroquine\*, Amodiaquine, Primaquine, Proguanil, Pyrimethamine\*, Quine, Trimethoprin.

**Tranquilizers** - Chloromazine\*, Prochlor Perazine, Trifluo, Perazine, Thiothixene, Haloperidol\*, Triperidol, Oxypertine, Chlordiazepoxide, Diazepam\*, Lorazepam, Meprobamate.

**Hypnotics** :- Phenobarbitone\*, Butobarbitone, Cyclobarbitone, Nitrazepam, Glutethimide\*, Methyprylon, Paraldehyde, Triclofos- sodium.

**General Anaesthetics** - Halothane\*, Gyllopropane\*, Diethyl ether\*, Methohexital Sodium, Thiopental Sodium, Trichloro ethylene. **Antidepressant Drugs** - Amitriptyline, Nortriptyline, Imipramine\* Phanelzine, Tranyl cypromine.

**Analeptics** - Theophylline, Caffeine\*, Goramine\*, Dextroamphetamine. **Adrenergic Drugs** - Adrenaline\*, Noradrenaline, Isoprenaline\*, Phenylephrine, Salbutamol, Terbutaline, Ephedrine\*, Pseudo ephedrine.

**Adrenergic Antagonist** - Tolazoline, Propranolol\*, Practalol. **Cholinergic Drugs** - Neostigmine\*, Pyridostigmine, Pralidoxime, Pilocarpine, Physostigmine\*.

**Cholinergic Antagonists** - Atropine\*, Byoscina, Homatropine, Propantheline\*, Benztropine, Tropicamide, Biperiden\*.

**Diuretic Drugs** - Furosemide\*, Chlorothiazide, Hydrochlorothiazide\*, Benthiiazide, Urea\*, Mannitol\*, Ethacrying Acid.

**Cardiovascular Drugs** - Ethyl nitrite \*, Glyceryl trinitrate, Alpha methyl dopa, Guanethidine, Clofibrate, Quinidine.

**Hypoglycemic Agents** - Insulin, Chlorpropamide\*, Thrombin, Monadione\*, Bishydroxycoumarin, Warfarin Sodium.

**Local Anaesthetics** - Lignocaine\*, Procaine\*, Benzocaine. **Histamine and Anti-histaminic Agents** - Histamine, Diphen hydramine\*, Promethazine, Cyproheptadine, Mepyramine, Pheniramine, Chlorpheniramine\*.

**Analgesics and Anti-Pyretics** - Morphine, Pethidine\*, Codeine, Methadone, Aspirin\*, Paracetamol\*, Analgin, Dextropropoxyphene, Pentazocine.

**Non-steroidal Anti-inflammatory Agents** - Indomethacin\*, Phenylbutazone\*, Oxyphenbutazone, Ibuprofen.

**Thyroxine and Antithyroides** - Thyroxine \*, Methimazole, Methyl thiouracil, Propylthiouracil.

**Diagnostic Agents** - Iopanoic acid, Propylidone, Sulfobromophthalein, Sodium, Indigotindisulfonate, Sodium ( Indigo Carmine), Evans Blue, Congo Red, Fluorescein Sodium.

\* Anticonvulsants, Cardiac glycosides, Antiarrhythmic, Antihypertensives & Vitamins.

**Steroidal Drugs** - Betamethazone, Cortisone, hydrocortisone, Prednisolone, Progesterone, Testosterone, Oestradiol Nandrolone.

**Anti Neo-plastic Drugs** - Actinomycins, Azathioprine, Busulphan, Chlorabucil, Cisplatin Cyclophosphamide, Daunorubicin, Hydrochloride, Fluorouracil, Mercaptopurine, Methotrexate, Mytomycin.

## PHARMACOLOGY AND TOXICOLOGY

1. Introduction to pharmacology, scope of pharmacology
2. Routes of administration of drugs, their advantages and disadvantages.
3. Various processes of absorption of drugs, and the factors affecting them, Metabolism, distribution and excretion of drugs.
4. General mechanism of drugs action and the factors which modify drugs action.
5. Pharmacological classification of drugs, The discussion of drugs should

emphasis the - following aspects :

- (i) Drugs acting on the Central Nervous System :
    - (a) General anaesthetics, adjunction to anaesthesia, intravenous anaesthetics.
    - (b) Analgesic and non-steroidal antipyretics, anti-inflammatory drugs, Narcotic analgesics, Antirheumatic and antigout remedies, Sedatives and Hypnotics, Psychopharmacological agents, anti convulsants, analeptics.
    - (c) Centrally acting muscle relaxants and antiparkinsonism agents.
  - (ii) Local anaesthetics.
  - (iii) Drugs acting on autonomic nervous system.
    - (a) Cholinergic drugs, Anticholinergic drugs, anticholinesterase drugs.
    - (b) Adrenergic drugs and adrenergic receptor blockers.
    - (c) Neurone blockers and ganglion blockers.
    - (d) Neuromuscular blockers, drugs used in myasthenia gravis.
  - (iv) Drugs acting on eye, mydriatics, drugs used in glaucoma.
  - (v) Drugs acting on respiratory system - Respiratory stimulants, Bronchodilators, Nasal decongestants, Expectorants and antitussive agents.
  - (vi) Antocoids, physiological role of histamine and serotonin, Histamine and Antihistamines, Prostaglandins.
  - (vii) Cardio Vascular drugs, Cardiotonics, Antiarrhythmic agents, Antianginal agents, Antihypertensive agents, Peripheral Vasodilators and drugs used in atherosclerosis.
  - (viii) Drugs acting on the blood and blood forming organs. Haematinics, Coagulants and anticoagulants, Haemostatics, Blood substitutes and plasma expanders.
  - (ix) Drugs affecting renal function - Diuretics and antidiuretics.
  - (x) Hormones and hormone antagonists - Hypoglycemic agents, Antithyroid drugs, sex hormones and oral contraceptives corticosteroids.
  - (xi) Drugs acting on digestive system- carminatives, digestants, Bitters, antacids and drugs used in peptic ulcer, purgatives and laxatives, Antidiarrhoeals, Emetics, Antiemetics, Antispasmodics.
6. Chemotherapy of microbial disease : Urinary antiseptics, Sulphonamides, Penicillins, Streptomycin, Tetracyclines and other antibiotics. Antitubercular agents, Antifungal agents, antiviral drugs, antileprotic drugs.
7. Chemotherapy of protozoal diseases. Anthelmintic drugs.
  8. Chemotherapy of cancer.
  9. Disinfectants and antiseptics. A detailed study of the action of drugs on each organ is not necessary.

### PHARMACEUTICAL JURISPRUDENCE

- 1) Origin and nature of Pharmaceutical legislation in India, its scope and objectives. Evolution of the "Concept of Pharmacy" as an integral part of the Health Care System.
- 2) Principles and significance of Professional Ethics, Critical study of the code of Pharmaceutical Ethics drafted by Pharmacy Council in India.
- 3) Pharmacy Act, 1948 - The General study of the Pharmacy Act with special reference to Education Regulations, working of State and Central Councils, constitution of these councils and functions. Registration procedures under the Act.

4) The Drugs and Cosmetics Act, 1940 - General study of the Drugs and Cosmetics Act and the Rules thereunder. Definitions and salient features related to retail and wholesale distribution of drugs. The powers of inspectors, the sampling procedures and the procedure and formalities in obtaining licences under the rule. Facilities to be provided for running a Pharmacy effectively. General study of the Schedules with special reference of schedules C, F, G, J, H, P and X and salient features of labelling and storage condition of drugs.

5) The Drugs and Magic Remedies ( Objectionable Advertisement) Act, 1954 - General study of the Act Objectives, special reference to be laid on Advertisements. Magic remedies and objectionable and permitted advertisements - disease which cannot be claimed to be cured.

6) Narcotic Drugs and Psychotropic Substances Act, 1985 - A brief study of the act with special reference to its objectives, offences and punishment.

7) Brief introduction to the study of the following acts.

- (i) Latest Drugs ( Price Control) Order in force.
- (ii) Poisons Act 1919 ( as amended to date)
- (iii) Medicinal and Toilet Preparations ( Excise Duties) Act. 1955 (as amended to date).
- (iv) Medical Termination of Pregnancy Act, 1971 (as amended to date).

### DRUG STORE AND BUSINESS MANAGEMENT

#### PART - I : COMMERCE

1. Introduction :- Trade, Industry and Commerce, Functions and subdivision of Commerce, Introduction to Elements of Economics and Management.

2. Forms of Business organisations.

3. Channels of Distribution.

4. Drug House Management - Selection of site, Space Lay-out and legal requirements.

Importance and objectives of Purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto.

5. Inventory control objects and importance, modern techniques like ABC, VED analysis, the lead time, inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal.

6. Sales promotion, Market research, Salesmanship, qualities of a sales man, advertising and window display.

7. Recruitment, training, evaluation and compensation of the pharmacist.

8. Banking and Finance Service and functions of bank. Finance planning and sources of finance.

#### PART - II : ACCOUNTANCY

1. Introduction to the accounting concepts and conventions,

Double entry book keeping, Different kinds of accounts.

2. Cash book.

3. General ledger and Trial balance.

4. Profit and loss account and balance sheet.

5. Simple technique of analysing financial statements.

Introduction to Budgeting.

## **HOSPITAL AND CLINICAL PHARMACY**

### **PART-I : HOSPITAL PHARMACY**

#### **1. HOSPITALS :**

Definition, Function, Classifications based on various criteria, Organisation, Management and Health delivery system in India.

#### **2. HOSPITAL PHARMACY :**

(a) Definition (b) Functions and Objectives of Hospital, Pharmaceutical services. (c) Location, layout, flow chart of materials and men. (d) Personnel and facilities requirements including equipments based on individual and basic needs. (e) Requirements and abilities required for Hospital Pharmacists.

#### **3. DRUG DISTRIBUTION SYSTEM IN HOSPITALS :**

(a) Out-patient services. (b) In-patient services :- (a) Types of services (b) Detailed discussion of Unit Dose system, Floor ward stock system, Satellite Pharmacy services, Central sterile services, Bed side pharmacy.

#### **4. MANUFACTURING :**

(a) Economical considerations, estimation of demand. (b) Sterile manufacture - large and small volume, parenterals, facilities, requirement, layout, production planning, man-power requirements. (c) Non-sterile manufacture - Liquid orals, externals, bulk concentrates. (d) Procurement of stores and testing of raw materials.

#### **5. INSTRUMENTS, EQUIPMENTS & ACCESSORIES :**

Nomenclature and uses of surgical instruments and Hospital Equipments & health accessories.

#### **6. P.T.C. ( Pharmacy Therapeutic Committee ) & H.F.S. (Hospital Formulary System) :**

Their organisation, functions and composition.

#### **7. DRUG INFORMATION SERVICE AND BULLETIN.**

#### **8. SURGICAL DRESSINGS & OTHER HOSPITAL SUPPLIES :**

Surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality. Other Hospital supply e.g. I.V. sets, B.G. sets, Ryals tubes, Catheters, Syringes etc.

#### **9. COMPUTERS IN HOSPITAL PHARMACY :**

Application of computers in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail Pharmacy establishments.

### **PART-II : CLINICAL PHARMACY**

#### **1. INTRODUCTION TO CLINICAL PHARMACY :**

Practice-Definition, scope.

#### **2. MODERN DISPENSING ASPECTS :**

Pharmacists and Patient counselling and advice for the use of common drugs, medication history.

#### **3. MEDICAL TERMINOLOGY :**

Common daily terminology used in the practice of medicine.

#### **4. DISEASE, MANIFESTATIONS AND PATHOPHYSIOLOGY :**

Including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardio-vascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.

#### **5. PHYSIOLOGICAL PARAMETERS :**

With their significance.

#### **6. DRUG INTERACTIONS :**

(a) Definition & introduction. (b) Mechanism of Drug interaction. (c) Drug - drug interaction with reference to analgesics, diuretics, cardio-vascular drugs, Gastro-intestinal agent vitamins and Hypoglycemic agents and (d) Drug-food interaction.

#### **7. ADVERSE DRUG REACTIONS :**

(a) Definition and significance. (b) Drug - induced diseases and Teratogenicity.

#### **8. DRUGS IN CLINICAL TOXICITY :**

Introduction, general treatment of poisoning, systematic antidotes. Treatment of insecticide poisoning, heavy metal poisoning, Narcotic drugs, Barbiturate, Organo phosphorus poisons.

#### **9. DRUG DEPENDENCE & ABUSE :**

Drug dependence, Drug abuse, Addictive drugs and their treatment, complications.

#### **10. BIO-AVAILABILITY OF DRUG :**

Including factors affecting it.

*Please confirm this syllabus from the original University Syllabus.  
We shall not be responsible for any changes or errors.*