

ESIC PHARMACIST SYLLABUS

EXAM PATTERN OF FINAL ESIC PHARMACIST EXAM

S.No.	Exam Type	Subjects	Questions / Marks	Exam Duration
1.	Multiple Choice Questions	Pharmacy Technical Knowledge	100 / 100	2 Hours
2.		• Aptitude	25/25	
3.		• General Awareness		
4.		• General Intelligence		
	Total		125/125	

Aptitude, General Intelligence Topics

Coding-Decoding, Non-Verbal Series, Clocks & Calendars, Arithmetical Reasoning, Statements & Arguments, Directions, Decision Making, Data Interpretation, Embedded Figures, Cubes and Dice, Blood Relations, Statements & Conclusions, Number Series, Mirror Images, Alphabet Series, Number Ranking, Syllogism, Analogy

PHARMACEUTICS - I

1. Introduction of different dosage forms: Their classification with their examples-their relative applications. Familiarization with new drug delivery systems.
2. Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia.
3. Metrology: Systems of weights and measures. Calculations including conversion from one system to another system. Percentage calculations and adjustment of products. Use of alligation method in calculations. Isotonic solutions.
4. Packaging of pharmaceuticals: Desirable features of a container and types of containers. Study of glass & plastics as materials for containers and rubber as a material for closure-their merits and demerits. Introduction to aerosol packaging.
5. Size reduction: Objectives and factors affecting size reduction, methods of size reduction- study of Hammer mill, ball mill, Fluid energy mill and Disintegrator.

6. Size separation: Size separation by sifting. Official standards for powders. Sedimentation methods of size separation. Construction and working of Cyclone separator.
7. Mixing and Homogenization: Liquid mixing and powder mixing, mixing of semisolids. Study of Silverson Mixer-Homogenizer, planetary Mixer; Agitated powder mixer; Triple Roller Mill; Propeller Mixer, colloid Mill and Hand Homogeniser. Double cone mixer.
8. Clarification and Filtration: Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following filtration equipments-Filter Press, sintered filters, Filter candles, Metafilter.
9. Extraction and Galenicals: (a) Study of percolation and maceration and their modification, continuous hot extraction Application in the preparation of tinctures and extracts. (b) Introduction to Ayurvedic dosage forms.
10. Heat process- Evaporation-Definition-Factors affecting evaporation-study of evaporating still and Evaporating pan.
11. Distillation: Simple distillation and Fractional distillation, steam distillation and vacuum distillation. Study of vacuum still, preparation of purified water I.P. Construction and working of the still used for the same.
12. Introduction to drying process: Study of Tray Dryers; Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.
13. Sterilization- Concept of sterilization and its differences from disinfections- Thermal resistance of microorganisms. Detailed study of the following sterilization process: 1. Sterilization with moist heat 2. Dry heat sterilization 3. Sterilization by radiation 4. Sterilization by filtration 5. Gaseous sterilization. Aseptic techniques: Applications of sterilization process in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment.
14. Processing of Tablets: Definition; different type of compressed tables and their properties. Processes involved in the production of tablets; Tablets excipients; Defects in tablets; Evaluation of Tablets; Physical standards including Disintegration and Dissolution. Tablet coating-sugar coating; films coating, enteric coating and micro-encapsulation (Tablet coating may be dealt in elementary manner)
15. Processing of Capsules: Hard and soft gelatin capsules; different sizes of capsules; filling of capsules; handling and storage of capsules. Special applications of capsules.
16. Study of immunological products like sera, vaccines, toxoids & their preparations

PHARMACEUTICAL CHEMISTRY - 1

1. General discussion on the following inorganic compounds including important physical and chemical properties, medicinal and pharmaceutical uses storage conditions and chemical incompatibility.

(A) Acids, bases and buffers: Boric acid, Hydrochloric acid, Strong Ammonium hydroxide, Calcium hydroxide, Sodium hydroxide and official buffers.

(B) Antioxidants: Hypophosphorous acid, Sulphur dioxide, Sodium bisulphate, Sodium meta bisulphite, Sodium thiosulphate, Nitrogen and Sodium nitrite.

(C) Gastrointestinal agents: 1. Acidifying agents- Dilute Hydrochloric acid. 2. Antacids- Sodium bicarbonate, Aluminum hydroxide gel, Aluminum phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide, Combinations of antacid preparations. 3. Protective and Adsorbents- Bismuth sub carbonate and Kaolin. 4. Saline cathartics- Sodium potassium tartrate and Magnesium sulphate.

(D) Topical Agents: 1. Protective- Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, siliconopolymers. 2. Antimicrobials and Astringents: Hydrogen peroxide*, Potassium permanganate, Chlorinated lime, Iodine, Solutions of Iodine, Povidone-iodine, Boric acid, Borax, Silver nitrate, Mild silver protein, Mercury, yellow Mercuric oxide, Ammoniated mercury. 3. Sulphur and its compounds- Sublimed sulphur, Percipitated sulphur, Selenium sulphide. 4. Astringents- Alum and Zinc Sulphate.

(E) Dental Products: Sodium fluoride, Stannous flouride, Calcium fluoride, Calcium carbonate, Sodium meta phosphate, Di-calcium phosphate, Strontium chloride, Zinc chloride.

(F) Inhalants- Oxygen, Carbon dioxide, Nitrous oxide.

(G) Respiratory stimulants: Ammonium carbonate.

(H) Expectorants and Emetics: Ammonium chloride*, Potassium iodide, Antimony potassium tartrate.

(I) Antidotes: Sodium nitrite.

2. Major Intra and Extra cellular electrolytes: (A) Electrolytes used for replacement therapy- Sodium chloride and its preparations, Potassium chloride and its preparations. (B) Physiological acid- base balance and electrolytes used- Sodium acetate, Potassium Acetate, Sodium bicarbonate Inj., Sodium citrate, Potassium citrate, Sodium lactate injection, Ammonium chloride and its injection. (C) Combination of oral electrolyte powders and solutions.

3. Inorganic official compounds of Iron, Iodine and Calcium, Ferrous Sulphate and Calcium Gluconate.

4. Radio pharmaceuticals and contrast media: Radio activity-Alpha; Beta and Gamma Radiations, Biological effects of radiations, Measurement of radio activity, G.M. Counter, Radio isotopes-their uses, Storage and precautions with special reference to the official preparations. Radio opaque contrast media-Barium sulfate.

5. Quality control of Drugs and pharmaceuticals: Importance of quality control, significant errors, methods used for quality control, sources of impurities in pharmaceuticals. Limit tests for Arsenic, Chloride, Sulfate, Iron and Heavy metals.
6. Identification tests for cations and anions as per Indian Pharmacopoeia

PHARMACOGNOSY

1. Definition, history and scope of Pharmacogonosity including indigenous system of medicine.
 2. Various systems of classification of drugs of natural origin.
 3. Adulteration and drug evaluation; significance of Pharmacopoeial standards.
 4. Brief outline of occurrence, distribution, outline of isolation, identification tests, therapeutic effects and pharmaceutical application of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.
 5. Occurrence, distribution, organoleptic evaluation, chemical constituents including tests wherever applicable and therapeutic efficacy of following categories of drugs.
- (a) Laxatives: Aloes, Rhubarb, Castor oil, Ispaghula, Senna.
 - (b) Cardiotonics - Digitalis, Arjuna.
 - (c) Carminatives & G.I. regulators: Umbelliferous fruits, Coriander, Fennel, Ajowan, Cardamom, Ginger, Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove.
 - (d) Astringents - Catechu.
 - (e) Drugs acting on nervous system: Hyoscyamus, Belladonna, Aconite, Ashwagandha, Ephedra, Opium, Cannabis, Nux -vomica.
 - (f) Antihypertensive - Rauwolfia.
 - (g) Antitussives - Vasaka, Tolu balsam, Tulsi.
 - (h) Antirheumatics - Guggal, Colchicum.
 - (i) Antitumour - Vinca.
 - (j) Antileprotics - Chaulmoogra oil.
 - (k) Antidiabetics - Pterocarpus, Gymnema sylvestro.
 - (l) Diuretics - Gokhru, Punarnava.
 - (m) Antidysenterics- Ipecacuanha.
 - (n) Antiseptics and disinfectants- Benzoin, Myrrh, Neem, Curcuma.
 - (o) Antimalarials- Cinchona.

(p) Oxytocics- Ergot.

(q) Vitamins- Shark liver oil and Amla.

(r) Enzymes- Papaya, Diastase, Yeast.

(s) Perfumes and flavoring agents- peppermint oil, Lemon oil, Orange oil, lemon grass oil, sandal wood.

(t) Pharmaceutical aids- Honey, Arachis oil, starch, kaolin, pectin, olive oil. Lanolin, Beeswax, Acacia, Tragacanth, sodium Alginate, Agar, Guar gum, Gelatin.

(u) Miscellaneous: Liquorice, Garlic, picrorhiza, Dioscorea, Linseed, shatavari, shankhpashpi, pyrethrum, Tobacco.

6. Collection and preparation of crude drugs for the market as exemplified by ergot, opium, rauwolfia, digitalis and senna.

7. Study of source, preparation and identification of fibers used in sutures and surgical dressings cotton, silk, wool and regenerated fibers.

8. Gross anatomical studies of Senna, Datura, Cinnamon, Cinchona, Coriander, Fennel, Clove, Ginger, Nux-vomica, Ipecacuanha.

BIOCHEMISTRY AND CLINICAL PATHOLOGY

1. Introduction to Biochemistry.

2. Brief chemistry and role of proteins, polypeptides and amino acids, classification, Qualitative tests, Biological value, Deficiency diseases.

3. Brief chemistry and role of carbohydrates, classification, qualitative tests, Diseases related to carbohydrate metabolism.

4. Brief chemistry and role of lipids, classification and qualitative tests. Diseases related to lipids metabolism.

5. Brief chemistry and role of vitamins and coenzymes.

6. Role of minerals and water in life processes.

7. Enzymes: Brief concept of enzymatic action factors affecting it. Therapeutic and pharmaceutical importance.

8. Brief concept of normal and abnormal metabolism of proteins, carbohydrate and lipids.

9. Introduction to pathology of blood and urine: (a) Lymphocytes and platelets, their role in health and disease (b) Erythrocytes-Abnormal cells and their significance (c) Abnormal constituents of urine and their significance in diseases.

HUMAN ANATOMY AND PHYSIOLOGY

1. Scope of Anatomy and physiology: Definition of various terms used in Anatomy.

2. Structure of cell, function of its components with special reference to mitochondria and microsomes.
3. Elementary Tissues: Elementary tissues of the body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.
4. Structure and function of Skelton. Classification of joints and their function. Joint disorders.
5. Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood.
6. Name and functions of lymph glands.
7. Structure and functions of various parts of the heart. Arterial and venous system with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders.
8. Various parts of respiratory system and their functions, physiology of respiration.
9. Various parts of urinary system and their functions, structure and functions of kidney. Physiology of urine formation. Patho-physiology of renal diseases and edema.
10. Structure of skeletal muscle, physiology of muscle contraction. Names, positions, attachments and functions of various skeletal muscles. Physiology of neuromuscular junction.
11. Various parts of central nervous system, brain and its parts, functions and reflex action. Anatomy and physiology of autonomic nervous system.
12. Elementary knowledge of structure and functions of the organs of taste, smell, ear, eye and skin. Physiology of pain.
13. Digestive system:-Names of various parts of digestive system and their functions. structure and functions of liver, physiology of digestion and absorption.
14. Endocrine glands and Hormones. Location of glands, their hormones and functions.
15. Reproductive System; Physiology and Anatomy of Reproductive system.

HEALTH EDUCATION AND COMMUNITY PHARMACY

1. Concept of health: Definition of physical health, mental health, social health, spiritual health determinants of health, indicators of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.
2. Nutrition and health: Classification of foods, requirements, diseases induced due to deficiency of proteins, vitamins and minerals-treatment and prevention.
3. Demography and family planning: Demography cycle, fertility, family planning, contraceptive methods, behavioral methods, hormonal contraceptives, population problem of India.
4. First aid: Emergency treatment in shock, snake-bite, burns, poisoning, heart disease, fractures and resuscitation methods, Elements of minor surgery and dressings.

5. Environment and health: Source of water supply, water pollution, purification of water, health and air, noise, light-solid waste disposal and control-medical entomology, arthropod borne diseases and their control, rodents, animals and diseases.
6. Fundamental principles of microbiology: Classification of microbes, isolation, staining techniques of organisms and prevention.
7. Communicable diseases: Causative agents, mode of transmission and prevention.
(a) Respiratory infections- chicken pox, measles, influenza, diphtheria, whooping cough and tuberculosis. (b) Intestinal infection: poliomyelitis, Hepatitis, cholera, Typhoid, food poisoning, Hookworm infection. (c) Arthropod borne infections: plague, Malaria, filariases. (d) Surface infection: Rabies, Trachoma, Tetanus, Leprosy. (e) Sexually transmitted diseases: Syphilis, Gonorrhoea, AIDS.
8. Non-communicable diseases: Causative agents, prevention, care and control: Cancer, Diabetes, Blindness, Cardiovascular disease.
9. Epidemiology: Its scope, methods, uses, dynamics of disease transmission. Immunity and immunization: Immunological products and their dose schedule. Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection procedures, for-faces, urine, sputum, room linen, dead-bodies, instruments.

PHARMACEUTICS-II

1. Dispensing Pharmacy: (I) Prescriptions... (II) Incompatibilities in prescriptions... (III) Posology: Dose and dosage of drugs, factors influencing dose, calculations of doses on the basis of age, sex, surface area and veterinary doses.
2. Dispensed Medications: (I) Powders... (II) Liquid oral Dosage forms: a. Monophasic... b. Biphasic Liquid Dosage Forms: (i) Suspensions... (ii) Emulsions... c. Semi-Solid Dosage Forms: (i) Ointments... (ii) Pastes... (iii) Jellies... (iv) An elementary study of poultice. (v) Suppositories and passaries...
3. Dental and cosmetic preparations: Introduction to Dentifrices, facial cosmetics, Deodorants. Anti perspirants, shampoo, Hair dressings and Hair removers.
4. Sterile Dosage forms: a. Parenteral dosage forms... b. Sterility testing... c. Ophthalmic products...

PHARMACEUTICAL CHEMISTRY-II

1. Introduction to the nomenclature of organic chemical systems with particular reference to hetero-cyclic system containing up to 3 rings.
2. The chemistry of following pharmaceutical organic compounds covering their nomenclature, chemical structure, uses and the important physical and chemical properties...

(1) Antiseptics and Disinfectants: Proflavine*, Benzalkonium chloride, Cetrimide, Chlorocresol, chloroxylenol, Formaldehyde solution, Hexachlorophene, Liquefied phenol, Nitrofurantoin.

(2) Sulphonamides: Sulphathiazole, Succinyl sulphathiazole, Sulphadimethoxine, sulphamethoxy pyridazine, sulphonamethoxazole, Co-trimoxazole, sulfacetamide*

(3) Antileprotic Drugs: Clofazimine, Thiambutosine, Dapsone*, solapsone.

(4) Anti-tubercular Drugs: Isoniazid*, PAS*, Streptomycin, Rifampicin, Ethambutol*, Thiacetazone, Ethionamide, cycloserine, pyrazinamide*.

(5) Antimoebic and Anthelmintic Drugs: Emetine, Metronidazole, Halogenated hydroxyquinolines, Diloxanide furoate, Paromomycin, Piperazine*, Mebendazole, D.E.C.*

(6) Antibiotics: Benzyl penicillin*, Phenoxy methyl penicillin*, Benzathine penicillin, Ampicillin*, Cloxacillin, Carbenicillin, Gentamicin, Neomycin, Erythromycin, Tetracycline, Cephalexin, Cephaloridine, Cephalothin, Griseofulvin, Chloramphenicol.

(7) Antifungal agents: Udecylenic acid, Tolnaftate, Nystatin, Amphotericin, Hamycin.

(8) Antimalarial Drugs: Chloroquine*, Amodiaquine, Primaquine, Proguanil, Pyrimethamine*, Quinine, Trimethoprim.

(9) Tranquilizers: Chlorpromazine*, Prochlorperazine, Trifluoperazine, Thiothixene, Haloperidol*, Triperidol, Oxypertine, Chlordizepoxide, Diazepam*, Lorazepam, Meprobamate.

(10) Hypnotics: Phenobarbitone*, Methypylon, Paraldehyde, Triclofosodium.

(11) General Anaesthetics: Halothane*, Cyclopropane*, Diethyl ether*, Methohexital sodium, Thiopental sodium, Trichloroethylene

(12) Antidepressant Drugs: Amitriptyline, Nortriptyline, Imperamine*, Phepeline, Tranylcypromine.

(13) Analeptics: Theophylline, Caffeine*, Coramine*, Dextro-amphetamine.

(14) Adrenergic drugs: Adrenaline*, Noradrenaline, Isoprenaline*, Phenylephrine, Salbutamol, Terbutaline, Ephedrine*, Pseudoephedrine.

(15) Adrenergic antagonist: Tolazoline, Propranolol*, Practolol.

(16) Cholinergic Drugs: Neostigmine*, Pyridostigmine, Pralidoxime, Pilocarpine, Physostigmine*.

(17) Cholinergic Antagonists: Atropine*, Hyoscine, Homatropine, Propantheline*, Benztropine, Tropicamide, Biperiden*.

(18) Diuretic Drugs: Furosemide*, Chlorothiazide, Hydrochlorothiazide*, Benzthiazide, Urea*, Mannitol*, Ethacrynic Acid.

(19) Cardiovascular Drugs: Ethylnitrite*, Glyceryl trinitrate, Alpha methyl dopa, Guanethidine, Clofibrate, Quinidine.

(20) Hypoglycemic Agents: Insulin, Chlorpropamide*, Tolbutamide, Glibenclamide, Phenformin*, Metformin.

(21) Coagulants and Anti coagulants: Heparin, Thrombin, Menadione*, Bisphydroxycoumarin, Warfarin sodium.[3 h]

(22) Local Anaesthetics: Lignocaine*, Procaine*, Benzocaine.

(23) Histamine and anti Histaminic Agents: Histamine, Diphenhydramine*, Promethazine, Cyproheptadine, Mepyramine*, Pheniramine, Chlorpheniramine*.

(24) Non-steroidal anti-inflammatory agents: Indomethacin*, Phenylbutazone*, Oxyphenbutazone, Ibuprofen.

(25) Thyroxine and Antithyroids: Thyroxine*, Methimazole, Methyl thiouracil, Propylthiouracil.

(26) Diagnostic Agents: Lopanoic Acid, Propylidone, Sulfobromophthalein-sodium, Indigotindisulfonate, Indigo Carmine, Evans blue, Congo Red, Fluorescein sodium.

(27) Anticonvulsants, cardiac glycosides, Antiarrhythmic, Antihypertensives & Vitamins.

(28) Steroidal Drugs: Betamethasone, Cortisone, Hydrocortisone, Prednisolone, Progesterone, Testosterone, Oestradiol, Nandrolone.

(29) Anti-Neoplastic Drugs: Actinomycin, Azathioprine, Busulphan, Chloramubucil, Cisplatin, Cyclophosphamide, Daunorubicin Hydrochloride, Fluorouracil, Mercaptopurine, Methotrexate, Mytomycin.

PHARMACOLOGY & TOXICOLOGY

1. Introduction to pharmacology, scope of pharmacology.
2. Routes of administration of drugs, their advantages and disadvantages. Various processes of absorption of drugs and the factors affecting them. Metabolism, distribution and excretion of drugs.
3. General mechanism of drugs action and their factors which modify drugs action.
4. Pharmacological classification of drugs. The discussion of drugs should emphasize the following aspects: (i) Drugs acting on the central Nervous system... (ii) Local anesthetics. (iii) Drugs acting on autonomic nervous system... (iv) Drugs acting on eye... (v) Drugs acting on respiratory system... (vi) Antacids... (vii) Cardio vascular drugs... (viii) Drugs acting on the blood and blood forming organs... (ix) Drugs

affecting renal function... (x) Hormones and hormone antagonists... (xi) Drugs acting on digestive system... (xii) Chemotherapy of microbial diseases... (xiii) Chemotherapy of protozoal diseases: Anthelmintic drugs. (xiv) Chemotherapy of cancer. (xv) Disinfectants and antiseptics.

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 of 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 there under. Definitions and salient features related to retail and whole sale distribution of drugs. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licenses under the rule. Facilities to be provided for running a pharmacy effectively. General study of the schedules with special reference to schedules C, C-1, F, G, J, H, P and X and salient features of labeling and storage conditions 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 objections and permitted advertisements-diseases 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: (1) Latest Drugs (price control) order in force. (2) Poisons Act 1919(as amended to date) (3) Medicinal and Toilet preparations (excise Duties) Act, 1955 (as amended to date) (4) Medical Termination of Pregnancy Act, 1971 (as amended to date)

DRUG STORE AND BUSINESS MANAGEMENT

1. Introduction-Trade, Industry and commerce, Functions and subdivision of commerce, Introduction to Elements for Economics and Management.
2. Forms of Business Organizations
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. Codification, handling of drug stores and other hospital supplies.

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 salesman, Advertising and Window Display
7. Banking and Finance- Service and functions of bank, Finance planning and sources of finance.
8. Introduction to the accounting concepts and conventions. Double entry Book Keeping, Different kinds of accounts.
9. Cash Book.
10. General Ledger and Trial Balance.
11. Profit and Loss Account and Balance Sheet.
12. Simple techniques of analyzing financial statements. Introduction to Budgeting.

HOSPITAL AND CLINICAL PHARMACY

PART-I: HOSPITAL PHARMACY

1. Hospital- Definition, Function, classifications based on various criteria, organization, 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 service b. In-patient services- Types of services 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, requirements, layout production planning, man-power requirements. c. Non-sterile manufacture- Liquid orals, externals, Bulk concentrates. d. Procurement of stores and testing of raw materials. e. Nomenclature and uses of surgical instruments and Hospital Equipments and health accessories.
5. P.T.C. (Pharmacy Therapeutic Committee)
6. Hospital Formulary system and their organization, functioning, composition.
7. Drug Information service and Drug Information Bulletin.
8. Surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality. Other hospital supply eg. I.V.sets, B.G. sets, Ryals tubes, Catheters, Syringes, etc.
9. Application of computers in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital retail pharmacy establishment.

PART II: CLINICAL PHARMACY

10. Introduction to Clinical pharmacy practice: Definition, scope.
11. Modern dispensing aspects- Pharmacists and patient counseling and advice for the use of common drugs, medication history.
12. Common daily terminology used in the practice of Medicine.
13. Disease, manifestation and Patho-physiology including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardio-vascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.
14. Physiological parameters with their significance.
15. Drug Interactions: a. Definition and introduction. b. Mechanism of Drug Interaction. c. Drug-drug interaction with reference to analgesics, diuretics, cardiovascular drugs, Gastro intestinal agents. Vitamins and Hypoglycemic agents. d. Drug-food interaction.
16. Adverse Drug Reaction: a. Definition and significance. b. Drug-Induced diseases and Teratogenicity.
17. Drugs in Clinical Toxicity: Introduction, general treatment of poisoning, systemic antidotes, Treatment of insecticide poisoning, heavy metal poison, Narcotic drugs, Barbiturate, Organo phosphorus poisons.
18. Drug dependences, drug abuse, addictive drugs and their treatment, complications.
19. Bio-availability of drugs, including factors affecting it.