

SYLLABUS FOR PHARMACY

1. PHARMACEUTICS (50 MARKS)

UNIT - I:

1. Introduction of different dosage forms. Their classifications with examples- their relative applications. Familiarisation 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 to another system. Percentage calculations and adjustments of products. Use of alligation method in calculations, Isotonic solutions.
4. Packing of pharmaceuticals-Desirable features of a container- types of containers, study of Glass and plastics as materials for containers and rubber as a material for closures- their merits and demerits. Introduction to aerosol packaging.

UNIT-II:

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 Standard for powders. Sedimentation methods of size separation. Construction and working of cyclone separator.
7. Mixing and Homogenization-Liquid-mixing and powder mixing. Mixing and semisolid, Study of Silverson Mixer - Homogeniser, 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 selections of filters. Study of the following filtration equipments - Filter Press, Sintered Filter, candles, Metafilter.
9. Extraction and Galenicals- (a) Study of percolation and maceration and their modification, continuous hot extraction-Applications 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 and water for Injection 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.

UNIT-III:

13. Sterilization – Concept of sterilization and its differences from disinfection – Thermal resistance of micro-organism. Detailed study of the following sterilization process.
 - (i) Sterilization with moist heat.
 - (ii) Dry heat sterilization.
 - (iii) Sterilization by radiation.
 - (iv) Sterilization by filtration and
 - (v) Gaseous sterilizationAseptic techniques. Application of sterilization processes in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipments.
14. Study of immunological products likes sera vaccines, toxoids & their preparations.

UNIT-IV:

15. Processing of tablets-Definition; Different types of compressed tablets and their properties. Processing involved in the production of tablets; Tablets; Physical Standards including Disintegration and Dissolution. Tablet coating- sugar coating; Film coating, enteric coating and, microencapsulation. Tablet coating may be dealt in an elementary manner.
16. Processing of Capsules- Hard and Soft gelatin capsules; different sizes capsules; filling of capsules; handling storage of capsules; Special application of capsules.

UNIT-V:

1. Dispensing pharmacy:

- (i) Prescriptions: Reading and understanding of prescription: Latin terms commonly used (Detailed study is not necessary), Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing.
- (ii) Incompatibilities in Prescriptions – Study of various types of incompatibilities – Physical, chemical and therapeutic.
- (iii) Posology – dose and Dosage of drugs, Factors influencing dose, Calculations of doses on the basis of age, sex and surface area, Veterinary doses.

UNIT-VI:

2. Dispensed Medications:

(Note: A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects. Use of appropriate containers and closures, Special labeling requirements and storage conditions should be highlighted).

- (i) Powders: Types of powders – Advantages and disadvantages of powders. Granules. Cachets and Tablet triturates. Preparation of different types of powders encountered in prescription Weighing methods, possible errors in weighing, minimum weighable amounts and weighing of material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.

UNIT-VII:

(ii) Liquid Oral Dosage Forms:

- (a) Monophasic – Theoretical aspects including commonly used vehicles, essential adjuvant like stabilizers, colorants and flavors, with examples.
Review of the following monophasic Liquids with details of formulation and practical Methods.

Liquids of internal

Mixtures and concentrates
Syrups
Elixirs

Liquids for external administration
or used on mucus membranes

Gargles
Mouth washes
Throat Paints
Douches
Ear Drops
Nasal drops & Sprays
Liniments
Lotions

(b) Biphase Liquid Dosage Forms:

(i) 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. Suspension produced by chemical reaction. An introduction to flocculated, non- flocculated suspension system.

(ii) Emulsions – Types of emulsions, identification of emulsion system , formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions. Preservation of emulsions.

UNIT-VIII:

(iii) Semi- Solid Dosage Forms:

a) Ointments – Types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by the following process.

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

(b) Pastes – Difference 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.

(e) 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.

(iv) Dental and cosmetic Preparations:

Introduction to Dentifrices, Facial cosmetics, Deodorants, Antiperspirants, Shampoos, hair dressings and hair removers.

UNIT-IX:

(v) Sterile Dosage Forms:

(a) Parenteral dosage forms- definitions. General requirements for parenteral dosage forms, Types of parenteral formulations, vehicles, adjuvants, processing personnel, facilities and Quality control. Preparation of intravenous fluids and admixtures. Total parenteral nutrition, dialysis fluids.

(b) sterility testing, particulate matter monitoring, faulty seal packaging.

(c) Ophthalmic products- study of essential characteristics of different ophthalmic preparations. Formulation additives. Special precautions in handling and storage of ophthalmic products.

UNIT-X:

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 – 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 the Rules hereunder. 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 licenses under the rule. Facilities to be provided for running a Pharmacy effectively. General study of the Schedules with special reference of schedules C, C1, F.G, J, H, P and X and salient features of labeling and storages condition of drugs.

UNIT-XI:

5. The Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954 – General study of the Act Objective, 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 of 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)

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2. PHARMACEUTICAL CHEMISTRY (50 MARKS)

UNIT-I:

1. General discussions on the following inorganic compounds including important physical and chemical properties, medical 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 bisulphite, Sodium metabisulphite, Nitrogen and Sodium Nitrite.

UNIT-II :

(C) Gastrointestinal agents:-

- I. Acidifying agents - Dilute hydrochloric acid.
- II. Antacids - sodium bicarbonate, Aluminium hydroxide gel, Aluminium phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium Oxide, Combinations of antacid preparations
- III. Protectives and Adsorbents- Bismuth subcarbonate and Kaolin.
- IV. Saline Cathartics- Sodium Potassium tartarate and Magnesium sulphate

UNIT-III:

(D) Topical Agents:-

- I. Protectives- Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, silicone polymers.
- II. 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.
- III. Sulphur and its compounds- Sublimed sulphur, precipitated sulphur, selenium sulphide.
- IV. Astringents - Alum and Zinc Sulphate.

UNIT-IV:

- (E) Dental Products-Sodium Fluoride, Stannous Fluoride, Calcium carbonate, Sodium metaphosphate, Dicalcium 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 tartarate.
- (I) Antidotes-Sodium nitrite

UNIT-V:

2. Major Intra and Extracellular electrolytes:-

- (A) Electrolytes used for replacement therapy-Sodium chloride and its preparation. Potassium chloride and its preparation.
- (B) Physiological acid-base balance and electrolytes used- Sodium acetate, Potassium acetate, Sodium bicarbonate injection, Ammonium chloride and its injection.
- (C) Combination of oral electrolyte Powder and Solutions.

UNIT-VI:

1. Inorganic Official compounds of iron, iodine, and calcium ferrous sulphate and Calcium gluconate.
2. Radio pharmaceuticals and Contrast media-Radio activity-Alpha, Beta and Gamma Radiations, Biological effects and Radiations Measurements of radio activity, G.M Counter, Radio isotopes their uses, storage and precautions with special reference to the official preparations.
3. Quality control of Drugs and Pharmaceuticals-Importance of quality control, significance efforts, methods used for quality control, sources of impurities in pharmaceuticals. Limit tests for Arsenic, Chloride, sulphate, Iron and Heavy Metals.
4. Identification tests for cations and anions as per Indian pharmacopeia.

UNIT-VII:

1. Introduction to the nomenclature of organic chemical systems with particular reference to heterocyclic 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 on those compounds marked with asterisk. (*).The stability and storage conditions and the different type of Pharmaceutical formulations of these drugs and their popular brand names.

Antiseptics and Disinfectants – Proflavine * Benzalkoniumchloride, cetrimide, chlorocresol * Chloroxylene, Formaldehyde solution, Hexachlorophene, Liquified phenol, Nitrofurantoin.

UNIT-VIII:

Sulfonamides–Sulfadiazine,Sulfaguandine*,Phthalylsulfathiazole,succinylsulfathizole.

Sulfadimethoxazole, Cotrimoxazole, Sulfacetamide*

Antileprotic Drugs – Clofazimine, Thiambutosine, Dapsone*, Solapsone.

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

Antiamoebic and Anthelmintic Drugs –Emetine, Metronidazole*, Halogenated hydroxyquinolines, diloxanide furoate, paramomycin , Piperazine*, Mebandazole, D.E.C.*

Antibiotics – Benzyl Penicillin*, Phenoxy methyl Penicillin*, Benzathine Penicillin, Ampicillin*, Cloxacillin, Carbencillin, Gentamicin, Neomycin, Erythromycin, Tetracycline, Cephalexin, Cephaloridine, Cephalothin, Griseofulvin, Chloramphenicol.

Antifungal agents – Undecylenic acid, Tolnaftate, Nystatin, Amphotericin, Hamycin

Antimalarial Drugs – Chloroquine, Amodiaquine, Primaquine, Trifluperazine, Thiothixene, Haloperidol, Triperidol, Oxypertine, Chlordiazepoxide, Diazepam, Lorazepam, Meprobamate.

UNIT-IX:

Hypnotics:- Phenobarbitone, butobarbitone, Cyclobarbitone, Nitrazepam, Glutethimide*, Methypylone, Paraldehyde, Triclofos sodium.

General Anaesthetics – Halothane*, Cyclopropane*, Diethylether*, Methohexital sodium, Thiopental sodium, Trichloroethylene.

Antidepressant Drugs - Amitriptyline, imipramine* phenelzine, Tranylcypromine.

Analeptics- Theophylline, Caffeine*, Coramine*, Dextroamphetamine.

Adrenergic Drugs- Adrenaline*, Noradrenaline, Isoprenaline*, Phenylephrine, Salbutamol, Terbutaline, Ephedrine*, Pseudoephedrine.

Adrenergic Antagonist – Tolazoline, Propranolol*, Practolol.

Cholinergic Drugs- Neostigmine*, Pyridostigmine, Pralidoxime, Pilocarpine, Physostigmine*.

Cholinergic antagonists-Atropine*, Hyoscine, Homatropine, Propantheline*, Benztropine, Tropicamide, Biperiden*.

Diuretic Drugs- Furosemide*, Chlorothiazide, Hydrochlorothiazide*, Benzthiazide, Urea*, Mannitol*, Ethacrynic Acid.

UNIT-X:

Cardiovascular Drugs- Ethyl nitrite*, Glyceryl Trinitrate, Alpha methyl dopa, Guanthidine, Chlorpropamide*, Tolbutamide, Glibenclamide, Phenformin*, Metformin.

Coagulants and Anti-Coagulants- Heparin, Thrombin, Menadione*, Bishydroxycoumarin, warfarin sodium.

Local Anesthetics - lignocaine, procaine, Benzocaine

Histamine and anti - histaminic agents – Histamine, Diphenhydramine*, Promethazine, Cyproheptadine, Mepyramine, Pheniramine, Chlorpheniramine*.

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

Non-steroidal anti –inflammatory Agents- indomethacin*, Phenyl butazone, oxyphenbutazone, Ibuprofen.

Thyroxine and Antithyroids- Thyroxine, Methimazole, Methylthiouracil, Propylthiouracil

Diagnostic Agents- Iopanoic Acid, Propyl iodone, Sulfobromophthalein, Sodium indigotin disulfonate, indigo Carmine, Evansblue, Congo Red, Fluorescein Sodium. ***Anticonvulsants**,

Cardiac glycosides, Antiarrhythmic, Antihypertensives & vitamins.

Steroidal drugs –Betamethazone, Cortisone, Hydrocortisone, Prednisolone, Progesterone, Testosterone, Oestradiol, Nandrolone

Anti-Neoplastic Drugs- Actinomycines, Azathioprine, Busulphan, Chlorambucil, cisplatin, Cyclophosphamide, Daunorubicin hydrochloride, Flurouracil, Mercaptopurine, Methotrexate, Mitomycin,

UNIT-XI:

1. Introduction to biochemistry.
2. Brief chemistry and role of proteins, polypeptides and amino acids, classifications, Quantitative 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, Qualitative tests, Diseases related to lipid Metabolism.
5. Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids.

UNIT-XII:

6. Brief Chemistry and role of vitamins and Coenzymes.
7. Role of minerals and water in life processes
8. Enzymes; Brief concept of enzymatic action. Factors affecting it. Therapeutic and pharmaceutical importance.
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.

3. PHARMACOGNOSY (50MARKS)

UNIT-I:

1. Definition, history and scope of Pharmacognosy 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 and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.
5. Collection and preparation of crude drug for the market as exemplified by Ergot, Opium, Rauwolfia, Digitalis, Senna.
6. Study of source, preparation and identification of fibres used in sutures and surgical dressings – cotton, silk, wool and regenerated fibre.
7. Gross anatomical studies of Senna, Datura, Cinnamon, Cinchona, Fennel, Clove, Ginger, Nuxvomica & Ipecacuanha

UNIT-II:

8. 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, Nuxvomica.
 - (f) **Antihypertensives** – Rauwolfia.
 - (g) **Antitussive** – Vasaka, Tolu balsam, Tulsi.
 - (h) **Antirheumatics** – Guggul, Colchicum.
 - (i) **Antitumour** – Vinca.
 - (j) **Antileprotics** – Chaulmoogra Oil.
 - (k) **Antidiabetics** – Pterocarpus, Gymnema Sylvestre
 - (l) **Diuretics** – Gokhru, Punarnava.

UNIT-III:

- (m) **Antidysentrics** – Ipecacuanha.
- (n) **Antiseptics and disinfectants** - Benzoin, Myrrh, Nim, curcuma.
- (o) **Antimalarials** – Cinchona.
- (p) **Oxytocics** – Ergot
- (q) **Vitamins** – Shark liver Oil and Amla.
- (r) **Enzymes** – Papaya, Diastase, Yeast.
- (s) **Perfumes and flavouring agents** – peppermint Oil, Lemon Oil, Orange, grass oils, Sandalwood.
- (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, Picrorrhiza, Dioscorea, Linseed. Shatavari, Shanknapushpi, Pyrethrum, Tobacco.

UNIT-IV:

1. Introduction – Trade, industry and Commerce, Functions and subdivision of commerce, introduction of Elements of 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, contract and price determination and legal requirements there to. 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 salesman, Advertising and Window Display.
7. Recruitment, training, evaluation and compensation of the pharmacist.

UNIT-V:

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 Account.
2. Cash Book
3. General Ledger and Trial Balance Sheet
4. Profit and Loss Account and Balance Sheet
5. Simple technique of analyzing financial statements, Introduction to Budgeting

UNIT-VI:

1. Concept of health- Definition of Physical health, mental health, social health, spiritual health determinants of health, indicator 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, disease 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, natural family planning method, chemical method, mechanical methods, hormonal contraceptives, population problem of India.
4. First aid – Emergency treatments in shock, snake bite, burns, poisoning, heart disease, fractures and resuscitation methods. Elements of minor surgery and dressings.
5. Environments and health – Sources of water supply, water pollution, purification of water, health and air, noise, light, solid waste disposal and control, medical entomology, arthropod borne disease and their control, rodents, animals and diseases.

UNIT-VII:

6. Fundamental Principles of microbiology, classification of microbes, isolation, staining techniques of organisms of common diseases.
7. Communicable diseases – Causative agents, modes of transmission and prevention.
 - (a) Respiratory infection – Chicken pox, measles, Influenza, diphtheria, whooping cough and tuberculosis.
 - (b) Intestinal infections; Poliomyelitis, Hepatitis, Cholera, Typhoid, Food Poisoning, Hookworm infection.
 - (c) Arthropod borne infections – plague, Malaria; Filariasis.
 - (d) Surface infection – Rabies, Trichoma, Tetanus, Leprosy.
 - (e) Sexually transmitted diseases – Syphilis, Gonorrhoea, AIDS.
8. Non- communicable diseases – causative agents, prevention, care and control.
Cancer, Diabetes; Blindness, Cardiovascular diseases.

9. Epidemiology its scope, methods, uses, dynamics of diseases of 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, disinfection procedures, faeces urine, sputum, room linen, dead-bodies, instruments.

UNIT-VIII:

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 of body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.
4. Structure and function of skeleton, Classification of joints and their function, joint disorder.
5. Composition of blood, functions of blood elements. Blood groups and coagulation of blood. Brief information regarding disorders of blood.
6. Name and functions of lymph glands.

UNIT-IX:

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, Pathophysiology of renal diseases and oedema.
10. Structure of skeletal muscle. Physiology of muscle contraction, Names, position, attachments and functions of various skeletal muscles, Physiology of neuromuscular junction.
11. Various part 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 the various parts of digestive system and their functions, structure and functions of liver, physiology of digestion and absorption.
14. Endocrine glands and Hormones. Locations of the glands, their hormones and functions. Pituitary, thyroid, Adrenal and pancreas.
15. Reproductive systems – Physiology and Anatomy of Reproductive system.

4. PHARMACOLOGY AND TOXICOLOGY (50 MARKS)

UNIT-I:

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 drug action

UNIT-II:

5. Pharmacological classification of drugs. The discussion of drugs should emphasise the following aspect:

- i) Drugs acting on the Central Nervous System:
 - a) General anaesthetics, adjunction to anaesthesia, intravenous anaesthetics.
 - b) Analgesic antipyretics and non-steroidal anti-inflammatory drugs, Narcotic analgesics, Antirheumatic and antigout remedies, Sedatives and Hypnotics,
 - c) Centrally acting muscle relaxants and anti-parkinsonism agents
- ii) Local anaesthetics.
- iii) Drug acting on autonomic nervous system
 - a) Cholinergic drug, 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.
 - e) Drugs acting on eye, mydriatics, drugs used in glaucoma.

UNIT-III:

- iv) Drugs acting on respiratory system-Respiratory stimulants, Bronchodilators, Nasal decongestants, Expectorants and Antitussive agents.
- v) Antacids, Physiological role of histamine and serotonin, Histamine
- vi) Cardio Vascular drugs, Cardio tonics, Antiarrhythmic agents, Antianginal agents, Antihypertensive agents, Peripheral Vasodilators and drugs used in atherosclerosis.
- vii) Drugs acting on the blood forming organs, Haematinics, Coagulants and anti- Coagulants, Haemostatics, Blood substitutes and plasma expanders.
- viii) Drugs affecting renal function- Diuretics and antidiuretics.
- ix) Hormones and hormone antagonists- hypoglycemic agents, Antithyroid drugs, sex hormones and oral contraceptives.
- (x) Laxatives, Antidiarrhoeals, Emetics, Antiemetics, Antispasmodics.

UNIT-IV:

6. Chemotherapy of microbial disease: Urinary antiseptics, Sulphonamides. Penicillins, Streptomycin. Tetracyclines and other antibiotics, Antitubercular agents, anti fungal Agents, anti viral 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.

UNIT-V:

1. Hospitals Definition, Function, Classification based on various criteria, organization, Management and Health delivery system in India.
2. Hospital Pharmacy:
 - a) Definitions

- b) Functions and objectives of Hospital Pharmaceutical services.
 - c) Location, Layout, Flowchart of material and men.
 - d) Personnel and facilities requirements 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
 - (a) Types of services
 - (b) detailed discussion of Unit system. Floor and ward stock system, Satellite Pharmacy Service, Central services, Bedside 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.

UNIT-VI:

5. Nomenclature and uses of surgical instruments and Hospital Equipments and health accessories.
6. P.T.C (Pharmacy Therapeutic Committee), 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 tape including their pharmacopoeial tests of quality. Other hospital supply e.g 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 and retail pharmacy establishments.

UNIT-VII:

1. Introduction to Clinical Pharmacy Practice – Definition, Scope
2. Modern dispensing – Pharmacists and Patient counseling advice for the use of common drugs, medication history.
3. Common daily terminology used in the practice of medicine.
4. Disease, manifestation and Pathophysiology including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardiovascular diseases, Epilepsy. Diabetes, peptic ulcer, Hypertension.
5. Physiological parameters with their significance.

UNIT-VIII:

6. 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
7. Adverse Drug Reaction:
- a) Definition and Significance.
 - b) Drug – induced disease and Teratogenicity.

8. Drugs in Clinical Toxicity – introduction, general treatment of poisoning, Systemic antidotes, Treatment of insecticide poisoning, heavy metal poison, Narcotic drugs Barbiturate, Organophosphorous poisons.
9. Drug dependence, Drug abuse, addictive drugs and their treatment, complications
10. Bio-availability of drugs, including factors affecting it.

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MODEL QUESTIONS FOR PHARMACY

1. Hypotonic solution on injecting leads to
1) Osmosis 2) Haemolysis 3) Crenulation 4) Hydrotrophy
2. The type of emulsion depends on
1) Method used 2) Oil 3) Emulsifying agent 4) Trituration
3. An example of general anesthetic.
1) Diethyl ether 2) Acetone 3) Morphine 4) Procaine
4. Causative agent of the Measles disease
1) Entamoeba histolytica 2) Ascaris lumbricoidis
3) Varicella zoster 4) Rubeola virus
5. Cardiac muscle is a type of
1) Epithelial tissue 2) Muscular tissue 3) Connective tissue 4) Nervous tissue

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