SYLLABUS
for
DIPLOMA IN PHARMACY
(D.Pharma)

School of Pharmacy
OPJS UNIVERSITY, CHURU(RAJASTHAN)

2014-15
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## SCHEME OF EXAMINATION

### D. PHARMA –I

<table>
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<th>Paper No.</th>
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D. PHARMA –I

D. PY. 101T-Pharmaceutics-I
Theory (75 Hours)

Unit-I
1. Introduction of different dosage forms. Their classification with examples-their relative applications. Familiarisation with new drug delivery systems.
2. Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia.
4. Packaging 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 closure-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.

Unit-III
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.
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.

Unit-IV
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 disinfection-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 and
   5. Gaseous sterilization.

Aspetic 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.

Unit-V
14. Processing of Tablets-Definition; different type of compressed tablets 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 microencapsulation (Tablet coating may be described in an elementary manner).
15. Processing of Capsules-Hard and soft gelation 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.

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D. PY. 102P-Pharmaceutics-I
Practical (100 Hours)

Preparation (minimum number stated against each of the following categories illustrating different techniques involved.
1. Aromatic waters
2. Solutions
3. Spirits
4. Tinctures
5. Extracts
6. Creams
7. Cosmetic preparations
8. Capsules
9. Tablets
10. Preparations involving
11. Ophthalmic preparations
12. Preparations involving aseptic techniques

D. PY. 103T-Pharmaceutical Chemistry-I
Theory (75 Hours)

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

Unit-I
A. Acids, bases and buffers-Boric acid, Hydrochloric acid, strong ammonium hydroxide, Sodium hydroxide and official buffers.
B. 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 cathortics: -sodium potassium tartrate and Magnesium sulphate.

Unit-II
C. Antioxidants: - Hypophosphorous acid, Sulphur dioxide, sodium bisulphite, sodium meta-bisulphite, Nitrogen and sodium Nitrite.
D. Topical Agents-
   i. Protectives: - Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, silicone polymers.
   iii. Sulphur and its compounds-Sublimed sulphur, precipitated sulphur, selenium sulphide.
   iv. Astringents-Alum and Zinc Sulphate.

Unit-III
E. Dental Products: - Sodium flouride, stannous flouride, calcium carbonate, sodium meta phosphate, Dicalcium phosphate, strontium chloride, Zinc chloride.
F. Inhalants-Oxygen, carbon dioxide, Nitrous oxide.
G. Respiratory stimulants-Ammonium carbonate.
I. Antidotes-sodium nitrite.

2. Major Intra and Extracellular 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 of Iron, Iodine and calcium, ferrous sulfate and calcium gluconate.

Unit-IV
5. Identification tests for cations and anions as per Indian pharmacopoeia.

Unit- V

6. 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.

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D. PY. 104P—Pharmaceutical Chemistry-I

Practical (75 Hours)

1. Identification tests for inorganic compounds particularly drug and pharmaceuticals.
2. Limit test for chloride, sulfate, Arsenic, Iron and Heavy metals.
3. Assay of inorganic pharmaceuticals involving each of the following methods of compounds marked with (*) under theory.
   a. Acid-Base titrations (at least 3)
   b. Redox titrations (one each of permanganometry and iodimetry).
   c. Precipitation titrations (at least 2)
   d. Complexometric titration (calcium and Magnesium).

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D. PY. 105T—Pharmacognosy

Theory (75 Hours)

Unit- I

1. Definition, history and scope of Pharmacognosy including indigenous system of medicine.
2. Various systems of classification of drugs and natural origin.
3. Adulteration and drug evaluation; significance of pharmacopoeial standards.

Unit- II

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.
   b. Cardiotonics: - Digitalis, Arjuna.

Unit- III

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. Dimetics-Gokhru,punarnava
m. Antidysenterics-Ipecacuanha
n. Antiseptics and disinfectants.Benzoin,Myrrh Nim,curcuma
o. Antimalarials- cinchona

p. Oxytocics- Ergot

q. Vitamins-Shark liver oil and Alma

r. Enzymes-papaya, diastase, yeast

s. Perfumes and flavouring agents-peppermint oil, Lemon oil, Orange oil, lemon grass oil, sandalwood.

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


Unit- V

6. Collection and preparation of crude drugs for the market as examplified by Ergot,opium, Rauwalfia, Digitalis, senna .

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


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D. PY. 106P-Pharmacognosy

Practical (75 Hours)

1. Identification of drugs by morphological characters.

2. Physical and chemical tests for evaluation of drugs wherever applicable.

3. Gross anatomical studies(t.s.)of the following drugs :Senna ,Datura, cinnamon ,cinchona,coriader,fennel , clove, Ginger,Nuxvomica,Ipecacuanha.

4. Identification of febres and surgical dressing.

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D. PY. 107T-Biochemistry and Clinical Pathology

Theory (50 Hours)

Unit- I

1. Introduction to biochemistry.

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

Unit- II

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

4. Role of minerals and water in life processes

Unit- III

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

Unit- IV
6. Brief chemistry and role of vitamins and coenzymes.

**Unit- V**
9. Introduction to pathology of blood and urine.
   a. Lymphocytes and platelets, their role in health and disease.
   b. Enthrocytes-Abnormal cells and their significance.
   c. Abnormal constituents of urine and their significance in diseases.

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**D. PY. 108P-Biochemistry and Clinical Pathology**

**Practical (75 Hours)**

2. Analysis of normal and abnormal constituents of Blood and Urine (Glucose, urea, creatine, creatinine, cholesterol, alkaline phosphatase, acid phosphatase, Bilirubin, SGPT, SGOT, calcium, Diastase, Lipase).
3. Examination of sputum and faeces (microscopic & staining).
4. Practice in injecting drugs by intramuscular, subcutaneous and intravenous routes, withdrawal of blood samples.

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**D. PY. 109T_Human Anatomy and Physiology**

**Theory (75 Hours)**

**Unit - I**
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 the body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.

**Unit - II**
6. Name and functions of lymph glands.

**Unit - III**
8. Various parts of respiratory system and their functions, physiology of respiration.
10. Reproductive system-physiology and Anatomy of Reproductive system.
Unit - IV
13. Elementary knowledge of structure and functions of the organs of taste, smell, ear, eye and skin. Physiology of pain.

Unit - V
14. Digestive system; names of various parts of digestive system and their functions. Structure and functions of liver, physiology of digestion and absorption.
15. Endocrine glands and Hormones. Location of glands, their hormones and functions. Pituitary, thyroid, Adrenal and pancreas

D. PY. 110P-Human Anatomy and Physiology
Practical (50 hours)
1. Study of the human skeleton.
2. Study with the help of charts and models of the following system and organs:
   a. Digestive system
   b. Respiratory system
   c. Cardiovascular system
   d. Urinary system
   e. Reproductive system
   f. Eye
   g. Ear
3. Microscopic examination of epithelial tissue, cardiac muscle, smooth muscle, skeletal muscle. Connective tissue and nervous tissues.
4. Examination of blood films for TLC. DLC and malarial parasite.
5. Determination of clotting time of blood, erythrocyte sedimentation rate and Haemoglobin value.
6. Recording of body temperature, pulse, heart-rate, blood pressure and ECG.

D. PY. 111T-Health Education and Community Pharmacy
THEORY (50 hours)

Unit- I
1. Concept of health: Definition of physical health, mental health, social health, spiritual health determinants of health, indicatory of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.
2. 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.

Unit- II
4. Fundamental principles of microbiology: Classification of microbes, isolation, staining techniques of organisms of common diseases.
Unit- III

5. **Non-communicable diseases:** causative agents, prevention, care and control. Cancer, diabetes, Blindness, Cardiovascular disease.

6. **Communicable diseases:** Causative agents, mode of transmission and prevention.
   a. Respiratory infections-chicken pox, measles, influenza, diptheria, whooping cough and tuberculosis.
   b. Intestinal infection- polmyelitis, 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.

Unit- IV

7. **Nutrition and health:** Classification of foods, requirements, diseases induced due to deficiency of proteins, vitamins and minerals-treatment and prevention.

8. **Demography and family planning:** Demography cycle, fertility, family planning, contraceptive methods, behavioral methods, natural family planning methods, chemical methods, mechanical methods, hormonal contraceptives, population problem of India.

Unit- V


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**D. PHARMA –II**

**D.PY.201T- Pharmaceutics-II**

Unit- I

1. **Dispensing Pharmacy:**
   i. **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.
   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- II

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 labelling requirements and storage conditions should be high-lighted).
   i. **Powders**- Type 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.

ii. **Liquid oral Dosage forms:**

a. **Monophasic**-Theoretical aspects including commonly used vehicles, essential adjuvant like
stabilizers, colourants and flavours with examples.

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<th>Liquids for internal administration</th>
<th>Liquids for external administration or used on mucous membranes</th>
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<td>Mixtures and concentrates, Syrups, Elixirs</td>
<td>Gargles, Mouth washes, Throat-paints, Douches, Ear Drops, Nasal drops &amp; Sprays, Liniments, Lotions.</td>
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Review of the following monophasic liquids with details of formulation and practical methods.

**Unit- III**

3. **Biphasic 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. Suspensions 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 agent. Instabilities in emulsions, preservation of
emulsions.

iii. **Dental and cosmetic preparations**: Introduction to Dentrifices, facial cosmetics,
Deodorants, Antiperspirants, shampoo, Hair dressings and Hair removers.

**Unit- IV**

4. **Semi-Solid Dosage Forms:**

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 poults.

e. **Suppositories and Passaries**- Their relative merits and demerits, types of suppositories,
suppository bases, Classification, Properties. Preparation and packing of suppositories.
Use of suppositories of drug absorption.

**Unit- V**

ii. **Sterile Dosage forms:**

a. Parenteral dosage forms- Definition, 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-Faculty seal packaging.
c. Ophthalmic products-study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.

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D. PY 202P-Pharmaceutics- II
Practical (100 Hours)

1. Dispensing of at least 100 products covering a wide range of preparations such as Mixtures, Emulsion, Solutions, Liniments, E.N.T. Preparations Ointments, Suppositories, Powders, Incompatible, prescription etc

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D. PY. 203T-Pharmaceutical Chemistry- II
Theory (100 hours)

Unit- I
a. Introduction to the nomenclature of organic chemical systems with particular reference to heterocyclic system containing upto 3 rings.
b. 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 brand names.
2. Sulfonamides: - Sulpadiazine, Sulfaguanidine*, phthaly1 sulfathiazole, methoxazole, co-trimoxazole, sulfacetamide*
3. Antileprotic Drugs-Clofazimine ,Thiambutosine, Dapsone*, solapsone,
5. Antimoebic and Anthelmintic Drugs-Emetine, Metronidazole, Halogenated hydroxyquinolines, diloxanide furate, paromomycin ,piperazine*, Mebendazole ,D.E.C.*

Unit- II

Unit- III
18. Diuretic Drugs-
Furosemide*, chlorothiazide, Hydrochlorothiazide*, Benzthiazide, Urea*, Mannitol*, Ethacrynic Acid.
19. Cardiovascular Drugs- Ethylnitrite*, Glyceril trinitrate, Alpha methy dopa, Guanethidine, clofibrate, Quinidine.

**Unit- V**
26. Thyroxine and Antithyroids- Thyroxine*, methimazole, Methyl thiouracil, propylthiouracil.
27. Diagnostic Agents- Lopanoic Acid, propylidione, sulfobromopthalein, sodium, Indigotindisulfonate, Indigo Carmine, Evans blue, Congo Red, Fluorescein sodium.
28. Anticonvulsants, cardiac glycosides, Antiarrrhythmic antihypertensives & vitamins.
29. Steroidal Drugs- Betamethasone, Cortisone, Hydrocortisone, prednisolone, progesterone, Testosterone, oestradiol, Nandrolone.
30. Anti-Neoplastic Drugs- Actinomycin, Azathioprie, Busulphan, chloramubucil, ciplatinm cyclophosphamide, Daunorubicin Hydrochloride, Fluorouracil, Mercaptopurine, Methotrexate, Mytomycin.

**D. PY. 204P-Pharmaceutical Chemistry- II**

**Practical (75 hours)**
1. Systematic qualitative testing of organic drugs involving solubility determination, melting point and/or boiling point, detection of elements and functional groups (10 compounds).
2. Official identification tests for certain groups of drugs included in the I.P. like barbiturates, sulfonamides, phenothiazines, Antibiotics etc.(8 compounds).
3. Preparation of three simple organic preparations.

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**D. PY. 205T-Pharmacology & Toxicology**

**Theory (75 hours)**

**Unit- I**
1. Introduction to pharmacology, scope of pharmacology.
2. Routes of administration of drugs, their advantages and disadvantagers.
4. General mechanism of drugs action and their factors which modify drugs action.

**Unit- II**
5. Pharmacological classification of drugs. The discussion of drugs should emphasise the following aspects:
   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, psychopharmacological agents, anticonvulsants, analeptics.
c. Centrally acting muscle relaxants and antiparkinsonism agents.

**Unit- III**

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, used in myasthenia gravis.

iv. Drugs acting on eye, Mydriatics, drugs used in glaucoma.

**Unit- IV**

v. Drugs acting on respiratory system—Respiratory stimulants, Bronchodilators, Nasal
   decongestants, Expectorants and Antitussive agents.

vi. Antacids, physiologic role of histamine and serotonin, Histamine and
   Antihistamines, prostaglandins.

vii. Cardiovascular 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, Antidiarrohoeals, Emetics, Antiemetics, Antispasmodics.

**Unit- V**

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.


9. Disinfectants and antiseptics. A detailed study of the action of drugs on each organ is not necessary.

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**D. PY. 206P-Pharmacology & Toxicology**

**Practical (50 hours)**

The first six of the following experiments will be done by the students while the remaining will be
demonstrated by the teacher.

1. Effect of potassium and calcium ions, acetylcholine and adrenaline on frog's heart.
2. Effect of acetyl choline on rectus abdominis muscle of frog and guinea pig ileum.
3. Effect of spasmogens and relaxants on rabbit's intestine.
4. Effect of local anaesthetics on rabbit cornea.
5. Effect of mydriatics and miotics on rabbit's eye.
6. To study the action of strychnine on frog.
7. Effect of digitalis on frog's heart.
8. Effect of hypnotics in mice.
9. Effect of convulsants and anticonvulsant in mice or rats.
10. Test for pyrogens.
11. Taming and hypnosis potentiating effect of chlorpromazine in mice/rats.
12. Effect of diphenhydramine in experimentally produced asthma in guinea pigs.

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D. PY. 207T-Pharmaceutical Jurisprudence
THEORY (50 hours)

Unit - I
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. Brief introduction to the study of the following acts:
   1. Poisons Act 1919 (as amended to date)
   2. Medicinal and Toilet preparations (excise Duties) Act, 1955 (as amended to date).
   3. Medical Termination of Pregnancy Act, 1971 (as amended to date).

Unit - II
3. Principles and significance of professional Ethics. Critical study of the code of pharmaceutical Ethics drafted by pharmacy council of India.

Unit - III
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.

Unit - IV
7. 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. Procedure and formalities in obtaining licenses under the rule.

Unit - V
8. The powers of Inspectors, the sampling procedures.
9. Facilities to be provided for running a pharmacy effectively. General study of the schedules with special reference to schedules C,C1,F,G,J,H,P and X and salient features of labeling and storage conditions of drugs.
D. PY. 208T-Drug Store and Business Management

Theory (75 hours)

Part I Commerce (50 hours)

Unit- I
1. Introduction-Trade, Industry and commerce, Functions and subdivision of commerce, Introduction to Elements for Economics and Management.
2. Channels of Distribution.
3. Drug House Management-selection of site, space Lay-out and legal requirments. 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.

Unit- II
4. Forms of Business Organizations.
5. Recruitment, training, evaluation and compensation of the pharmacist.

Unit- III
7. 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.
8. Sales promotion, Market Research, Salemanship, qualities of a saleman, Advertising and Window Display.

Part II Accountancy (25 hours)

Unit- IV

Unit- V

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D. PY. 209T-Hospital and Clinical Pharmacy

Theory (75 hours)

Part-I: Hospital Pharmacy:

Unit- I

1. Hospital- 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 service
   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.

Unit- II

4. Manufacturing:
   a. Economical considerations, estimation of demand.
   b. Sterile manufacture-Large and small volume parenterals, faciliteis, requirements, layour production planning, man-power requirements.
   c. Non-sterile manufacture-Liquid orals, externals, Bulk concentrates.
   d. Procurement of stores and testing of raw materials.
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 organisation, functioning, composition.
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.

Part II: Clinical Pharmacy:

Unit- III

9. Introduction to Clinical pharmacy practice-Definition, scope.
10. Modern dispensing aspects-pharmacists and patient counselling and advice for the use of common drugs, medication history.
11. Common daily terminology used in the practice of Medicine.
12. Disease, manifestation and pathophysiology including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardio-vascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.
13. Bio-availability of drugs, including factors affecting it.

Unit- IV

14. Physiological parameters with their significance.
15. Drug Interactions:
   a. Definition and introduction.
   d. Drug-food interaction.
16. Averse Drug Reaction:
   a. Definition and significance.
   b. Drug-Induced diseases and Teratogenicity.

Unit- V
17. Drugs in Clinical Toxicity-Introduction, general treatment of poisoning, systemic antidotes, treatment of insecticide poisoning, heavy metal poison, Narcotic drugs, Barbiturate, Organophosphorus poisons.
18. Drug dependences, drug abuse, addictive drugs and their treatment, complications.
19. Application of computers in; maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital retail pharmacy establishment.

D. PY. 210P-Hospital and Clinical Pharmacy
Practical (75 hours)
1. Preparation of transfusion fluids.
2. Testing of raw materials used in (1)
4. Sterilization of surgical instruments, Glassware and of the hospital supplies

School of Pharmacy
OPJS UNIVERSITY, CHURU(RAJASTHAN)
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