

B.Pharm 5TH Semester

1.5.1: Pharmaceutics-V

Theory

36 Hours

UNIT-I

- 1. Liquid Dosage Forms: Introduction, types of additives used in formulations, vehicles, stabilizers, preservatives, suspending agents, emulsifying agents, solubilizers, colors, flavours and others. Manufacturing, packaging and evaluation of clear liquid, suspensions including magmas, gels and emulsions official in Pharmacopoeia.**
- 2. Semisolid Dosage Forms: Definitions, types, mechanism of drug penetration, factors influencing penetration, semisolid bases and their selection. General formulation, manufacturing procedure, evaluation and packing of semisolids and clear gels.**
- 3. Suppositories: Ideal requirements- bases, manufacturing procedure, packaging and evaluation.**
- 4. Extraction and Galenical Products:- Principle and method of extraction, preparation of infusion, tinctures and extracts(Dry, soft, liquid).**

UNIT-II

- 5. Ophthalmic Preparations: Requirements, formulations, methods of preparation, containers, evaluation.**
- 6. Aerosols: Definition, propellants, general formulation, manufacturing and packaging methods, Pharmaceutical applications, Evaluation.**

Practical : 36 hours

- 1. Preparation and evaluation of liquid orals, solutions, suspensions and emulsions; Ointments, Eye drops, Eye Ointments.**
- 2. Any other experiments to substantiate theory.**

B.Pharm 5TH Semester

1.5.2: Pharmaceutical Chemistry-V (Biochemistry)

Theory

36 Hours.

UNIT-I

1. Bio chemical organization of the cell and transport processes across cell membranes.
2. Bio energetic.
 - (a) Concept of free energy and its determination; Redox potential;
 - (b) Energy rich compounds, ATP; Cyclic AMP; their biological significance.
3. Biological Oxidation.

- a) Electron transport chain(its mechanism and role).
- b) Inhibitors and Uncouplers of ETC.
- c) Oxidative phosphorylation
- d) Substrate level phosphorylation and oxidative phosphorylation.

4. Enzymes and Coenzymes:

- a) Definition; Nomenclature; IUB Classification.
- b) Properties of enzymes;
- c) Factors effecting enzymes activity;
- d) Enzyme kinetics (Michaelis plot; Line Weaver Burke plot).
- e) Enzyme Inhibition(with example)
- f) Iso- Enzymes
- g) Enzyme Induction; repression
- h) Applications of enzymes
- i) Coenzymes, categories of reactions requiring coenzymes;
 - a. Structure of, its coenzyme, and biochemical role of
 - b. Vitamins- water soluble, fat soluble.

5. Carbohydrate metabolism:

- i) Introduction
- i) Glycolysis
- ii) Glycogenesis glycogenolysis
- iii) TCA cycle; (Amphibolic nature of TCA cycle).
- iv) Gluconeogenesis

(Intermediates: Malate aspartate)

- vi) HMP Shunt Pathway;
- vii) Uronic acid pathway and galactose metabolism.
- viii) Glucose tolerance test and blood glucose regulation

UNIT-II

6. Lipid metabolism:

- a. Introduction.
- b. Beta-Oxidation of saturated
- c. Beta-Oxidation of unsaturated fatty acids(a linolenic acid)
- d. Formation and fate of ketone bodies
- e. Cholesterol metabolism
- f. Biosynthesis of fatty acids(de novo)
- g. Phospholipids and sphingolipids.

7. Amino acid metabolism:

- a) Amino acids definition, classification
- b) General reactions of amino acids: Transamination, Deamination and decarboxylation of amino acids.
- c) Urea cycle
- d) Metabolism of sulphur containing amino acids.
- e) Catabolism of tyrosine, tryptophan, phenylalanine
- f) Synthesis & significance of biologically important substances: creatine, histamine, 5-HT, dopamine, noradrenaline, adrenaline.
- g) Porphyrins, Bile Pigments; Hyperbilirubinemia.

7. Nucleotides and Nucleic acids.

- a) Introduction
- b) Biosynthesis of Purine nucleotides
- c) Biosynthesis of Pyrimidine nucleotides
- d) Catabolism of purines and pyrimidines
- e) DNA structure, significance as genetic material
- f) RNA types, structure & significance
- g) Replication or DNA synthesis
- h) Mutation and repair of DNA.
- i) Transcription or RNA synthesis

✓
j) Genetic code.

k) Translation or protein synthesis and its inhibition.

8. Principles and significance for following Biochemical tests:-

a) Kidney function tests.

b) Liver function tests

c) Lipid profile.

Practical

36 hours

1. Identification of carbohydrates (scheme and identification).

(Glucose, fructose, lactose, maltose, sucrose)

2. Identification of proteins (Scheme and identification)

(casein, albumin, gelatin, peptone)

3. Quantitative estimation of carbohydrates (any one method)

DNS reagent, Anthrone Reagent.

4. Quantitative estimation of proteins (any one method): Biuret Reagent, Lowry's Reagent

5. Qualitative analysis of Urine for.

a) Normal constituents.

b) Abnormal constituents

6. Quantitative analysis of blood.

a. Estimation of glucose in blood (Florin-Wu method)

b. Estimation of creatinine in blood.

c. Estimation of cholesterol in blood.

d. Estimation of urea in serum.

e. Estimation of SGOT in serum

f. Estimation of SGPT in serum.

7. Preparation of standard buffer solutions (Acetate; Borate; Carbonate, Citrate and Phosphate) and measurement of P^H (any two)

B.Pharm 5TH Semester

1.5.3: Pharmacy Practice (Hospital & Community Pharmacy)

Theory

36 Hours.

UNIT-I

1. Definition, scope of community pharmacy, Roles and responsibilities of Community Pharmacist; Code of Ethics.
2. Community Pharmacy Management.
 - (i) Selection of site, space layout and design.
 - (ii) Staff, materials- coding, stocking.
 - (iii) Legal requirements.
 - (iv) Maintenance of various registers.
 - (v) Use of computers: Business and health care software.
3. Prescriptions- Parts of prescription, handling, legality, identification of medication related problems like drug interactions and Incompatibility. Modern concept of dispensing pharmacy and practice of commonly prescribed medicines at counter.
4. Inventory Control in Community Pharmacy:- Definition, various methods of Inventory Control ABC, EOQ Lead time, safety stock. Finance for community pharmacy.
5. Pharmaceutical Care: Definition and principles of pharmaceutical care.
6. communication skills and patient counseling: Need, strategies to overcome barriers, Emphatic listening, body language, interpersonal relationship, psychological aspect of illness, conflict resolution and crisis management, patient information leaflets- content, design and layouts, advisory labels.

UNIT-II

7. Patient Compliance: Definition, factors affecting compliance, role of Pharmacist in improving the compliance.
8. Health Screening Services: Definition, importance, methods for screening blood pressure/ blood sugar/ lung function and cholesterol testing.

9. OTC Medication- Definition, OTC medication list and counseling.
10. Hospital Pharmacy: The role of Hospital Pharmacy, department and its relationship to other hospital departments and staff. The pharmacy and Therapeutic committee Formulary and guidelines; Drug distribution methods, central sterile supply division. Concept of Essential drugs and Rational drug use.
11. Drug Information Centre, prescribed medication order and interpretation. Medication error. Clinical trials.
12. Code of Ethics for community pharmacists. Good community Pharmacy Practice (GCPP)

Practical

36 hours

1. Analysis of prescriptions for legality and drug interactions.
2. Counseling the patients of Diabetes, Hypertension, Asthma, COPD, Anemia, Peptic Ulcer, Tuberculosis and AIDS.
3. Practice of commonly prescribed medicines at dispensing counter. Health screening services:
 - Measurement of B.P.
 - Capillary Blood Glucose measurement
 - Lung function assessment through peak flow meter
4. Posology of commonly used drugs.
5. Project report on visit to nearby hospital pharmacy and community pharmacy on rational use of drugs.

List of Assignments:

1. Communication skills for pharmacists.
2. Design of community pharmacy to incorporate all pharmaceutical care services.
3. Role of community pharmacist in smoking cessation program.
4. Various pharmaco-economic models in health care cost management.

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B.Pharm 5TH Semester

1.5.4: Pathophysiology & Toxicology

Theory

36 Hours.

UNIT-I

1. Basic principles of cell injury and adaptation:

- (i) Causes, pathogenesis and morphology of cell injury.
- (ii) Abnormalities in lipoproteinaemia, glycogen infiltration and glycogen storage disease.

2. Inflammation:

- A) i) Pathogenesis of acute inflammation.
- ii) Chemical mediators in inflammation
- iii) Pathogenesis of chronic inflammation.

- B) Repairs of wounds in the skin.
- Factors influencing healing of wounds.

3. Diseases of Immunity:

- i) Introduction to T and B cells.
- ii) MHC proteins or transplantation antigens
- iii) Immune Tolerance.

A). Hypersensitivity:

- ii. Hypersensitivity type I, II, III, IV.
- iii. Biological significance of hypersensitivity.
- iv. Allergy due to food, chemicals and drugs.

B) Auto-immunity:

- i) Mechanism of Autoimmunity.
- ii) Classification of autoimmune diseases in man.
- iii) Transplantation and allograft reactions, mechanism of rejection of allograft.

✓
C) Acquired Immune Deficiency Syndrome (AIDS)

D) Amyloidosis.

4. Cancer:

Disturbances of growth of cells,

General biology of tumors,

Differences between benign and malignant tumors

Classification of tumors

Histological diagnosis of malignancy

Etiology and pathogenesis of cancer

Invasions, metastasis, patterns of spread of cancer.

5. Shock: Types, mechanism, stages and Management

UNIT-II

6. Biological effects of radiation:

7. Environment and Nutritional diseases:

(i) Air pollution and smoking- SO₂, NO, NO₂, CO

(ii) Protein calorie malnutrition, vitamins, obesity, starvation.

8. Pathophysiology of common diseases:

i) Parkinsonism.

ii) Schizophrenia

iii) Depression and Mania

iv) Stroke (Ischemic and Hemorrhage)

v) Hypertension

vi) Angina

vii) Myocardial Infarction

viii) CCF

ix) Atherosclerosis

x) Diabetes Mellitus

xi) Peptic ulcer and inflammatory bowel disease

xii) Cirrhosis and Alcoholic liver diseases.

xiii) Acute and chronic renal failure.

xiv) Asthma and chronic obstructive airway diseases.

9. Infectious diseases.

✓ Hepatitis- infective hepatitis,

Sexually transmitted diseases (Syphilis, Gonorrhoea, HIV)

Pneumonia, Typhoid, Urinary tract infections

Tuberculosis, Leprosy, Malaria, Dysentery (Bacterial and amoebic)

10. Toxicology- Types of Poisoning – acute, chronic and cumulative poisoning, Heavy metal poisoning- Symptoms and treatment. General management of the poisoned patient (Drug Poisoning).

B.Pharm 5TH Semester

1.5.5: Pharmaceutical Analysis-II

Theory

36 Hours.

UNIT-I

1. Theoretical considerations and applications of Non-aqueous titration's, complexometric titrations, diazotisation titrations.
2. Gasometric analysis- Introduction, absorbents hempel apparatus, assay and tests for purity of oxygen, Nitrous oxide, Helium, Determination of nitrates and ammonia salts. Oxygen flask combustion method, Kjeldahl method of nitrogen estimation.
3. Solvent Extraction Methods: Distribution law and partition coefficient, general methods for salts of alkaloids and other bases, liquid galenicals, crude drugs and dry extracts, acids in crude drugs and galenicals, neutral substances. Determination of strychnine in Nux vomica, morphine in opium, phenobarbitone sodium. Chelating and other extraction reagents. Determination of lead by the Dithizone method.

UNIT-II

4. Chromatography: Introduction, classification of chromatographic methods, paper chromatography: general discussion, factors affecting the R_f values, basic operations involved, applications. Paper electrophoresis- types, preparation, procedure, detection, and applications. Thin layer chromatography- general discussions basic operations involved, applications, HPTLC. Column chromatography - general discussion, adsorbents and solvents, packing of the column and operation, applications.
 - (a) Ion exchange chromatography- introduction, types of exchanges, mechanism of ion- exchange column operation, applications.
 - (b) Gas chromatography and High performance liquid chromatographic methods: General principles, relationship between retention time and partition ratio, capacity, factor selectivity factor, column efficiency, band

broadening, optimization of column performance. Instrumentation and application of GLC & HPLC.

5. Potentiometric titrations: Theoretical considerations, electro-chemical cells, uses and half cells, electrodes, measurements of potential p^H meter, applications.
6. Conductometric titrations: Basic concepts, different types of conductometric titrations, apparatus used, applications.
7. Polarography: Introduction, theoretical considerations, Instrumentation and applications.
8. Amperometric titrations: General procedure, titration, curves applications.
Coulometric titrations - general procedure, dead stop and point titration, applications.

Practical : 36 hours

1. Experiments based on non-aqueous titrations complexometric titrations, diazotisation, Kjeldahl Karl Fischer method of water content estimation alcohol content in liquid galencials, solvent extraction, SS chromatographic methods, potentiometric, conducto- metric methods. Exercise involving Polarimetry.
2. Any other experiments to substantiate theory.

B.Pharm 5TH Semester

1.5.6: Pharmaceutical Industrial Management

Theory

36 Hours.

UNIT-I

- 1. Principles of Management (Coordination, Communication, Motivation, Decision making, leadership, innovation, creativity, Delegation of authority, Responsibility, Record keeping).**
- 2. Accountancy: Principles of Accountancy, ledger posting and book entries. Preparation trial balance, columns of a cash book, bank reconciliation statement, rectification of errors, profit and loss account, balance sheet, purchase keeping and pricing of stocks, treatment of cheques, bills of exchange, promissory notes and hundies, documentary bills.**
- 3. Economics: Principles of economics with special reference to the laws of demand and supply, demand schedule, demand curves, labour welfare, general principles of insurance and inland and foreign trade, procedure of exporting and importing goods.**
- 4. Pharmaceutical Marketing: Functions, buying, selling, transportation, storage, finance, feedback, information, channels of distribution, wholesale, retail, departmental store, multiple shop and mail order business.**

UNIT-II

- 5. Salesmanship: Principles of sales promotion, advertising, ethics of sales, merchandising, literature, detailing, Recruitment, trading, evaluation, compensation to the Pharmacist.**
- 6. Pre-requisites (Basic Information Services), Concept of management, administrative management (Planning, organizing, staffing, directing and controlling), entrepreneurship development, operative management (personnel, materials, production, financial, marketing, time/space, morale). Principles of management (Coordination, Communication, Motivation, Decision making, Leadership, Innovation, Creativity, Delegation of authority, Responsibility,**

Record keeping). Identification of key points to give a maximum thrust for development and perfection.

7. **Materials Management:** A brief exposure of the basic principles of materials management purchase, stores and inventory control (eligibility, efficiency, evaluation, Recruitment methodology, service conditions, termination, performance evaluation, etc.)
8. **Production Management:** A brief exposure of the different aspects of production management (visible and invisible inputs, methodology of activities, performance evaluation technique, process flow, process know-how, maintenance management.
9. **Site selection for a Pharmaceutical Unit-** Factors to be considered, conditions as per Sch. M of Drugs & Cosmetic Act.