



DR. A P J ABDUL KALAM UNIVERSITY, INDORE

B.Sc. Under Graduate Annual System Syllabus

(W.e.f. July 2017 Onwards)

Class: - B.Sc.

Subject: - Pharmaceutical Chemistry

Paper: - Ist

Paper Title: - Pharmaceutical Organic Chemistry (BPS101T)

Max Marks: - 42.5

Course Content

Unit 1

Historical development of Pharmaceutical Chemistry, Atomic and molecular orbital, covalent bond, hybrid orbitals, intermolecular forces, bond dissociation energy (homolysis and heterolysis), polarity of bonds and molecules, structure and physical properties (melting point, boiling point, solubility), resonance, inductive effect, field effect, hyper conjugation, hydrogen bonding.

Acids and bases: Arrhenius concept, Bronsted-Lowry concept, strength of acids and bases, Lewis concept, pH, pKa, pKb values, buffers, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

Unit 2

Physicochemical properties and molecular constitution: Surface and interfacial tension, refractive index, optical rotation, dielectric constant, dipole moment, density, viscosity, molar refraction and parachor.

Stereo isomerism: Optical isomerism-optical activity, enantiomerism, diastereoisomerism, meso compounds. Elements of symmetry, chiral and achiral molecules. DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers. Reactions of chiral molecules.

Racemic modification and resolution of racemic mixture.

Geometric isomerism: Nomenclature of geometrical isomers, methods of determination of configuration of geometrical isomers.

Unit 3

Types of organic reactions, Mechanism of organic reactions: Curved arrow notations, drawings electron movement with arrows, half headed and double headed arrow, Electrophiles and nucleophiles, Reaction intermediates: Formation, structure, stability and reactivity of carbocation, carbanion, free radicals.

Unit 4

Classification of drugs on the basis of sources (Biological, Geographical, Marine, Minerals).



Theories of drug action: Biological defenses, chemical defenses, surface active agents, metabolic antagonism, enzyme neutralizers.

Unit 5

Introduction to dosage forms: Classification and definitions, routes of drug administration. Aromatic waters, syrups, tinctures and infusions.

Introduction to medicinal system: Ayurvedic, Unani, Siddha, Homeopathic, Allopathic.

Weights and measures: Imperial and Metric system, calculations involving percentage solutions, allegation, proof spirit and isotonic solutions based on freezing point and molecular weight.

Books Recommended:

1. Organic Chemistry by Morrison and Boyd.
2. Organic Chemistry Vol . I by I.L Finar.
3. Physical Pharmacy by Alfred Martin.
4. Text book of Pharmacognosy by Kokate, Purohit , Gokhale.
5. Foye's Medicinal Chemistry.
6. Text Book of Professional Pharmacy by Jain and Sharma.
7. Practical Organic Chemistry by Arun Sethi
8. Practical Organic Chemistry by Garg and Saluja.
9. Practical Organic Chemistry by Jagdamba Singh



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Class: - B.Sc.

Subject: - Pharmaceutical Chemistry

Paper: - IInd

Paper Title: - Inorganic and Pharmaceutical Analysis (BPS102T)

Max Marks: - 42.5

Course Content

Unit 1

Impurities in pharmaceutical substances: History of Pharmacopoeia, Sources and types of impurities, effect of impurities, permissible impurities in pharmaceutical substances, methods used to purify inorganic substances, Test of purity, Limit test principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy Metals.

Unit 2

Pharmaceutical analysis- different techniques of analysis, Methods of expressing concentration , Primary and secondary standards, Preparation and standardization of various molar and normal solutions-Oxalic acid , sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate. Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures.

Unit 3

Acid base titration: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong , weak and very weak acids and bases , neutralization curves.

Non aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCU.

Redox titrations: Concepts of oxidation and reduction and types of redox titrations (Principles and applications: Cerimetry, Iodimetry, Iodometry, Titration with potassium iodate)



Unit 4

Precipitation titrations: Mohr's method, Volhard's Modified, Volhard's Fajans method, estimation of sodium chloride.

Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate and calcium gluconate.

Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate. Basic Principle, method and applications of diazotization titration.

Unit 5

Preparation of following compounds and their uses: Alum , Aluminium hydroxide gel , Antimony potassium tartrate , aromatic spirit of ammonia, boric acid , potassium citrate, sodium benzoate, Milk of magnesia, magnesium carbonate , zinc oxide.

Books Recommended:

1. Inorganic Pharmaceutical Chemistry by Gundu Rao.
2. Inorganic Pharmaceutical Chemistry by Chatwal.
3. Bentley and Driver's Textbook by Pharmaceutical Chemistry.
4. Oharmaceutical Analysis I and II, Kasture , Wadodkar.
5. Pharmeuceutical Analysis by Kar.
6. Analytical Chemistry, Chatwal.



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Class: - B.Sc.

**Subject: - Pharmaceutical Chemistry
Practical**

Max Marks: 50

1. Identification of element and group present in organic compounds.
2. Determination of Solubility of benzoic acid over a range of temperatures.
3. Determination of surface tension, viscosity.
4. Preparation of aromatic waters, syrup, and tinctures.
5. Preparation of buffer solution and measurement of pH
6. Identification of the unknown compound from the literature using melting point/
boiling point.
7. Limit test chloride, sulphate, iron and lead.
8. Preparation of inorganic pharmaceuticals: Alum, Aluminium hydroxide gel, milk
of magnesia, ferrous ammonium sulphate, antimony potassium tartarate.
9. Preparation and standardization of sodium hydroxide, Oxalic acid.
10. Assay of Ammonium chloride, Borax, Zinc Oxide, Sodium Carbonate.
11. Assay of Copper sulphate by Iodometry.
12. Volumetric estimation of ferrous sulphate using Oxalic acid, Potassium
permanganate and potassium dichromate.
13. Viva-voce
14. Practical Record.