

COURSE MODULE
PHARMACEUTICAL CHEMISTRY

B.Sc. Part I , **Semester I**
Paper I : Organic Pharmaceutical Chemistry **Max. Marks 35**

Unit I **7 marks**

Historical development of Pharmaceutical chemistry. Pharmacy and Pharmaceutical chemistry as a career. Codes of pharmaceutical ethics. Important aspects of Pharmaceutical chemistry. Importance of chemistry in pharmacy.

Unit II **7 marks**

- (a) Pharmacopoeia
- (b) History of Pharmacopoeia and Monograph.
- (c) Chemical approach to the remedy of diseases.
- (d) Classification of drugs on the basis of (i) Chemical structure, (ii) Therapeutic Action (at least one example of each class).

Unit III **7 marks**

- A.** Source and uses of natural drug products:
 - (a) Biological sources of drugs (plants, animals and microbes).
 - (b) Geographical sources of drugs.
 - (c) Marine sources of drugs.
 - (d) Mineral sources of drugs.
- B.** Theories of drug action
 - (a) Biological defenses.
 - (b) Chemical defenses.
 - (c) Surface-active agents.
 - (d) Metabolic antagonism.
 - (e) Enzyme neutralizers
 - (f) Absorption of drugs.

Unit IV **7 marks**

- (a) Routes of drug administration.
- (b) Nature of drug receptors.
- (c) Isolation of drug receptors
- (d) Modification of drug receptors.
- (e) Receptors theories.

Unit V **7 marks**

Physiological functions, Digestion and Biological Oxidation of Carbohydrates, Vitamins, Fats, Lipids.

**COURSE MODULE
PHARMACEUTICAL CHEMISTRY**

B.Sc. Part I ,

Semester I

Paper II : Inorganic Pharmaceutical Chemistry

Max. Marks 35

Unit I

7 marks

Impurities in Pharmaceutical substance and their tests:

- (a) Sources of impurities in pharmaceutical chemicals
- (b) Effects of impurities.
- (c) Permissible impurities in pharmaceutical substances

Unit II

7 marks

Impurities in Pharmaceutical substance and their tests:

- (a) Methods used to purify inorganic substances.
- (b) Tests of purity.
- (c) Limit tests.

Unit III

7 marks

Volumetric estimation:

- (a) Introduction of volumetric estimation.
- (b) Conduction of Volumetric analysis.
- (c) Requirement for Volumetric analysis.
- (d) Advantages of Volumetric analysis.
- (e) Primary standard.
- (f) Method of expressing concentration in volumetric analysis and numericals based on it.

Unit IV

7 marks

Types of Titration methods:

- (a) Acid –Base titration.
- (b) Non- Aqueous titration.
- (c) Oxidation-Reduction titration.
- (d) Precipitation titration.
- (e) Complex formation titration.

Unit V

7 marks

Preparation of the following compounds and their uses:

- (a) Alum.
- (b) Aluminium hydride gel.
- (c) Aluminium hydroxide gel.
- (d) Aluminium hydride tablets.
- (e) Antimony potassium tartarate .

Practicals – Pharmaceutical Chemistry

B.Sc. Part I

Semester I

Max. Marks 50

- | | |
|--|----------|
| 1. Preparation of Pharmaceutical Compounds : | 12 marks |
| (a) Tincture iodine. | |
| (b) Aspirin. | |
| (c) Antimony potassium tartarate. | |
| (d) Alum. | |
| 2. Volumetric estimation: | 12 marks |
| (a) Sodium carbonate in sodium bicarbonate. | |
| 3. Iodine Value, Specification Value. | 12 marks |
| 4. Viva | 06 marks |
| 5. Diary | 08 marks |

Books recommended

1. G. R. Chatwal : Pharmaceutical Chemistry Inorganic, Vol. I
2. G. R. Chatwal : Pharmaceutical Chemistry Inorganic, Vol. II
3. Pontley's Davis : Text Book of Pharnaceuticals
4. Allpart : Chemistry and Pharmacy of Vegetable Drug
5. Abraham Cantrew and Bernard Sehep : Biochemistry
6. Dr. J.L Jain : Fundamentals of Biochemistry
7. Dr.H.S.Srivastawa: Elements of Biochemistry
8. Dr. M.C. Pant : Essentials of Biochemistry
9. B.S. Bahl and G.D. Tuli : Physical Chemistry

**COURSE MODULE
PHARMACEUTICAL CHEMISTRY**

**B.Sc. Part I ,
II**

Semester

Paper I : Organic Pharmaceutical Chemistry

Max Marks 35

Unit I

7 marks

Physiological functions, Digestion and Biological Oxidation of Amino acid,
Proteins and Minerals in the living system.

Unit II

7 marks

Different types of medicinal systems:
Ayurvedic, Unani, Siddha, Homeopathic, Allopathic and other systems.

Unit III

7 marks

Liquid Solutions such as aromatic waters, Lotions, crude extracts such as Tincture
and infusions.

Unit IV**7 marks**

System of Weights and measures in Pharmacy.

Unit V**7 marks**

Dilution and concentration of formulation, calculation by allegation,
Pharmaceutical dosage.

**COURSE MODULE
PHARMACEUTICAL CHEMISTRY**

**B.Sc. Part I ,
II****Semester****Paper II : Inorganic Pharmaceutical Chemistry****Max. Marks 35****Unit I****7 marks**

Preparation of the following compounds and their uses:

- (f) Antimony sodium tartrate injection .
- (g) Ammonium bicarbonate.
- (h) Ammonium chloride tablets.
- (i) Aromatic spirit of ammonia.

Unit II**7 marks**

Preparation of the following compounds and their uses:

- (a) Boric acid.
- (b) Borax.
- (c) Plaster of Paris.

- (d) Milk of Magnesia.
- (e) Potassium citrate.

Unit III

7 marks

Preparation of the following compounds and their uses:

- (a) Magnesium compounds
- (b) Zinc oxide
- (c) Sodium benzoate.
- (d) Sodium borate.

Unit IV

7 marks

Preparation, Properties and Stability of Colloids.

Unit V

7 marks

Colloids and their application in Pharmacy.

Practicals – Pharmaceutical Chemistry

B.Sc. Part I

Semester II

Max. Marks 50

- | | |
|--|----------|
| 1. Preparation of Pharmaceutical Compounds : | 12 marks |
| (a) Acetanilide. | |
| (b) Salicylic acid. | |
| (c) Charm alum. | |
| (d) Ferrous ammonium sulphate. | |
| 2. Volumetric estimation: | 12 marks |
| (a) Ferrous sulphate using | |
| (i) Oxalic acid | |
| (ii) KMnO_4 | |
| (iii) $\text{K}_2\text{Cr}_2\text{O}_7$ | |
| 3. RH values of oils and fats. | 12 marks |
| 4. Viva | 06 marks |
| 5. Diary | 08 marks |

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1. G. R. Chatwal : Pharmaceutical Chemistry Inorganic, Vol. I
2. G. R. Chatwal : Pharmaceutical Chemistry Inorganic, Vol. II
3. Pontley's Davis : Text Book of Pharnaceuticals
4. Allpart : Chemistry and Pharmacy of Vegetable Drug
5. Abraham Cantrew and Bernard Sehep : Biochemistry
6. Dr. J.L Jain : Fundamentals of Biochemistry
7. Dr.H.S.Srivastawa: Elements of Biochemistry
8. Dr. M.C. Pant : Essentials of Biochemistry
9. B.S. Bahl and G.D. Tuli : Physical Chemistry

B Sc II
SEMESTER III
BIOINFORMATICS

PAPER-I MOLECULAR GENETICS

UNIT-I CHROMOSOME

1. Packaging of genetics material in prokaryotes
2. Bacterial genome
3. Structure of chromosome (in eukaryotes)
4. Chemical composition of chromosome

UNIT-II MUTATION

1. Gene mutation
2. Chromosomal mutation
3. Types of mutation and mutagenic agents
4. Molecular basis of mutations
5. Role of mutation in evolution

UNIT-III NUCLEIC ACIDS

1. Structure of RNA
2. Structure of DNA
3. Replication of DNA (Eukaryotic)
4. Packaging of DNA as nucleosome and solenoids in eukaryotes

UNIT-IV GENES

1. Genetics code- its structural and functional aspects
2. Split gene, overlapping genes, pseudo genes
3. Regulation of gene expression : OPERON circuit positive and negative controls
4. 'LAC' operons

UNIT-IV PLASMIDS

1. Classification of plasmids, replication, transfer and recombination in plasmids
2. IS – insertion Sequence
3. Mechanism of transposition- introduction of molecular markers- different types with example

RECOMMENDED BOOKS

- | | |
|---|-------------------------------------|
| 1. Cell and molecular biology | P K Gupta |
| 2. Genetics | P K Gupta |
| 3. Genetics Vol I | C B Panwar |
| 4. Genetics Vol II | C B Panwar |
| 5. Gene VIII | Lewin |
| 6. Gene V | Lewin |
| 7. The Gene | Purohit |
| 8. Concept of genetics VII Edition | William S Klag , Michal R
Cuming |
| 9. Cell biology-genetics and microbiology | Verma |
| 10. Genetic Engineering Genetics IV edition | |
| 11. Genetics- A molecular Approach | |
| 12. Genetics | Verma |
| 13. The Gene | Purohit |
| 14. Genetics from genes to genome- | Hertwell |
| 15. Cell biology, genetics, molecular biology Evolution and ecology | R S Verma and V K Agrawal |

PRACTICAL

1. Squash preparation – i) Onion root tip and
ii) Chironomous larva
2. Study of various stages of meiosis
3. DNA isolation
4. Problems based on genetics

SEMESTER III
BIOINFORMATICS

PAPER II BIOMATHS

UNIT – I SETS THEORY

1. Sets of number-significant figures
2. Decimal places
3. Series- AP,GP,HP
4. Countable and uncountable sets.

UNIT – II LOGIC

1. Mathematical Propositions
2. Logical operation AND, OR etc.
3. Truth tables theory of inference deduction
4. Pigeon hole principle and its generalization

UNIT – III PROBABILITY

1. Concept of random experiments.
2. Types of events.
3. Classical definition of probability
4. Laws of additional multiplication of probability

UNIT IV - DATA ANALYSIS

1. Collection and preservation of data
2. Analysis of data, types of data
3. Diagrammatic representation – bar diagram, line diagram
4. Frequency polygon, frequency curve and histogram

UNIT – V BIOSTATISTICS

1. Measures of central tendencies Mean, Mode, Median and its simple calculations
2. Test of significance – t test and chi square test
3. Correlation – positive and negative correlation and calculation of Carl Pearson coefficient of correlation
4. Standard deviation

TEXT AND SUGGESTED READING BOOKS

Biostatics by Sarus Publication

Statistical Methods by D C Agrawal

RECOMMENDED BOOKS

- | | |
|---|-------------------------|
| 1. Biostatistics | Arora |
| 2. Biostatistics | Verma and Shukla |
| 3. Biostatistics | Krishnan |
| 4. Biostatistical Analysis | J H Zar |
| 5. Biostatistics- Concepts and Application | Chouhan T S |
| 6. Elements of Biostatistics | Satguru Prasad |
| 7. Biostatistics | P.Rama Krishna |
| 8. Basic Biostatistics | Kumar S and Satya Veeri |
| 9. Fundamentals of Biostatistics : Practical Approach | Dutta, Naren K |
| 10. Basic Concept of Biostatistics | Arumugam |
| 11. Methods of Biostatistics | B K Mahajan |
| 12. Biostatistics | P N Arora |
| 13. Biostatistics | P Ramakrishna |
| 14. Biostatistics | Verma and Agrawal |
| 15. Biostatistics | Subramanium |

PRACTICALS

1. Exercise Based on Probability
2. Exercise Based on Preparation of GRAPHS
3. Exercise Based on a) Mean, b) Mode, c) Median
4. Calculation T or X value

Biology Group

B.Sc.II
BIOINFORMATICS

SEMESTER IV

PAPER-I GENETIC ENGINEERING

UNIT-I

1. Historical background of genetic engineering
2. Applications of genetic engineering
3. Recombinant DNA technology
4. Applications of recombinant DNA technology

UNIT-II

1. Detection of target DNA
2. Techniques involved in gene manipulation- gene cloning and PCR
3. Southern, Northern and Western blotting and electrophoresis
4. DNA fingerprinting

UNIT-III

1. Gene transfer, selection of transformants
2. Gene transfer methods and transgenic organism
3. Molecular probes
4. Multigene families in eukaryotes

UNIT-IV

1. Structure of gene
2. Isolation of gene
3. Sequencing of gene or DNA fragment
4. Synthesis of gene

UNIT-V

1. Hybridoma technology
2. Gene libraries
3. Gene therapy
4. Cloning vectors

RECOMMENDED BOOKS

- | | |
|---|-------------------------------------|
| 1. Cell and molecular biology | P K Gupta |
| 2. Genetics | P K Gupta |
| 3. Genetics Vol I | C B Panwar |
| 4. Genetics Vol II | C B Panwar |
| 5. Gene VIII | Lewin |
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| 8. Concept of genetics VII Edition | William S Klag ,
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| 14. Genetics from genes to genome- | Hertwell |
| 15. Cell biology, genetics, molecular biology Evolution and ecology | |

R S Verma and V K Agrawal

B Sc.II

SEMESTER IV

BIOINFORMATICS

PAPER-II COMPUTER LANGUAGES OF BIOINFORMATICS

UNIT-I DATA BASE MANAGEMENT

1. Understanding of human data
2. Basic database concept
3. Data base type
4. Client server technology

UNIT-II SQL

1. Introduction to SQL and types of SQL
2. Role of SWL in data base architecture
3. SQL performance tuning
4. Security management using SQL

UNIT-III PROGRAMMING IN STRUCTURED QUERY LANGUAGE-I

1. Advantage of PL/SQL, architecture, basic data type structure error
2. Control structure of PL/SQL – sequence control, conditional control, unconditional control
3. Cursor, locks
4. Error handling PL/SQL

UNIT-IV PROGRAMMING IN STRUCTURED QUERY LANGUAGE-II

1. Procedures
2. Functions
3. Database triggers
4. Dynamic SQL applications using dynamic SQL

UNIT-V LANGUAGES

1. Creations of forms, tables, list and images
2. Introduction to bio cobra
3. Introduction to bio python
4. Introduction to bio java

TEXT AND SUGGESTED READING BOOKS

RDBMS by Ivan Barros, BPB Publications

PERL by Rastogi Publication

RECOMMENDED BOOKS

- | | |
|---|---------------|
| 1. SQL,PL/SQL | Bayross |
| 2. Concept of DBMS | Naik |
| 3. Web Enabled Concepts | |
| 4. SQL and HTML | N |
| 5. Hand Book of Bioinformatics | Nellam Yadav |
| 6. Introduction to Bioinformatics | S SundarRajan |
| 7. Fundamental of Bioinformatics | Krane |
| 8. Text of Bioinformatics | |
| 9. Introduction to Bioinformatics | T K Altwood |
| 10. Bioinformatics | S C Rastogi |
| 11. Instant Notes of Bioinformatics | D R Wostherd |
| 12. Bioinformatics Dominant | Subramaniyam |
| 13. Bioinformatics Concept, Skill and Application | S C Rastogi |
| 14. Bioinformatics Approaches and Application | C Chakraborty |
| 15. Bioinformatics Methods and Protocol | Misenser |
| 16. | |

PRACTICAL SYLLABUS

Practical Application of DBMS, SQL and PL/SQL and PERL