

#### Scheme of Examination B.Sc. Semester-V (w.e.f. July 2016 Onwards)

#### (Non Grading)

| Course Name               | Subject  | Theory Max. Marks |     |          | Practical<br>Max Marks |              | Total        |     |
|---------------------------|--|-------------------|-----|----------|------------------------|--------------|--------------|-----|
|                           |  | Internal          |     | External |                        | Max<br>Marks | Min<br>Marks |     |
|                           |  | Max               | Min | Max      | Min                    |              |              |     |
| Foundation                | HINDI+ ENGLISH<br>FCS 501 HE                                     | 10+05=15          | 05  | 50+35=85 | 28                     | -            | -            | 100 |
| Courses                   | Basics of Computer &<br>Information Technology - I<br>FCS 502 EP | 15                | 05  | 35       | 12                     | -            | -            | 50  |
|                           | BOTANY<br>BSB 501 T  | 15                | 05  | 85       | 28                     | 50           | 17           | 100 |
|                           | BOTANY<br>BSB 501 P  | -                 | -   | -        | -                      | 50           | 17           | 50  |
|                           | CHEMISTRY<br>BSC 502 T   | 15                | 05  | 85       | 28                     | 50           | 17           | 100 |
| B.Sc. Pharma<br>Chemistry | CHEMISTRY<br>BSC 502 P   | -                 | -   | -        | -                      | 50           | 17           | 50  |
|                           | PHARMA CHEMISTRY<br>BSP504 T                                     | 15                | 05  | 85       | 28                     | 50           | 17           | 100 |
|                           | PHARMA CHEMISTRY<br>BSP504 P                                     | -                 | -   | -        | -                      | 50           | 17           | 50  |
| Total                     |  |                   |     |          |                        |              |              | 600 |



B.Sc. Under Graduate Semester wise Syllabus (w.e.f. session 2016 onwards)

#### Class: - B.Sc. Semester: - V<sup>th</sup> Semester Subject: - Botany (BSB501T) Paper: - PLANT PHYSIOLOGY AND BIOCHEMISTRY Marks 85+15 CCE

**Unit-1** Plant Water Relations: Properties of water, Importance of water in plant life, Diffusion, Osmosis & Osmotic relation to plant cell. Water Absorption, Ascent of Sap. Transpiration: Structure & Physiology of Stomata, Mechanism of Transpiration, Factors affecting the rate of transpiration.

**Unit -2** Plant Nutrition: Mineral nutrition, Hydroponics, Absorption of mineral Nutrients, Translocation of organic solutes. Biomolecules: Structure Classification and functions of Carbohydrates, Amino Acids, Proteins and Lipids.

**Unit-3** Photosynthesis: Chloroplast, Photosynthetic pigments, Red drop, Emerson' effect, Concept of two Photosystems, Light reaction, Dark reaction – Calvin cycle, Hatch & Slack cycle, CAM cycle, Factors affecting rate of photosynthesis & Photorespiration.

**Unit-4** Respiration: Mitochondria, aerobic and anaerobic respiration, Respiratory coefficient, mechanism of respiration - Glycolysis, Kreb's cycle, Pentose Phosphate Pathway, Electron transport system, Factors affecting rate of respiration, Redox potential and theories of ATP synthesis.

**Unit-5** Enzymology: Classification, nomenclature and characteristics of Enzymes, Concept of holoenzyme, apoenzyme, co-enzyme and co-factors. Mode & mechanism of enzyme action, Factors affecting enzyme activity.

Plant Hormones: Discovery, Structure mode of action and role of Auxins, Gibberellins, Cytokinin ,Abscissic acid and Ethylene.

#### SUGGESTED READINGS:-

- David, L. N. and Michael, M. C. 2000. Lehninger's Principle of Biochemistry, Macmillan worth Pub. New York, USA.
- Gangulee, H.C., Das, K.S., Datta, C. and Sen, S. 2007. College Botany Voll.I, New Central Book Agency (P) Ltd. Kolkata, 700009.
- Hopkins, W.G. 1995. Introduction of Plant Physiology Pub. John wiley and Sons New York.
- Jain, V.K. 1974. Fundamentals of Plant Physiology, S. Chand & Company.
- Pandey, B. P. 2010. A Text book of Botany- Angiosperms, S. Chand & Company Ltd. Ramnagar, New Delhi- 110055.
- Taiz & Zeiger, E. 1998. Plant Physiology. Sinauer associates, Inc. Pub. Massachusetts U.S.A.
- Verma, S.K. & Verma, M.A. 1995. Text book of Plant Physiology & Biotechnology. S. Chand & Company.
- Verma, V. 1995. Plant Physiology, Emkey Pub.



#### Class: - B.Sc. Semester: - V<sup>th</sup> Semester Subject: - Botany (BSB501P)

#### **Objectives:**

To impart the skills of handling and setting up of apparatus to conduct plant Physiological experiments, Collection of data and interpretation of results.

#### **Exercise:**

- 1- Preparation of solution of specific Normality, Molal and Molar solutions.
- 2- Exercises related to osmosis and osmotic relation.
- 3- Exercises related to Transpiration.
- 4- To separate Plastidial pigments by Paper Chromatography.
- 5- To perform the exercise of Photosynthesis & Respiration.
- 6- To perform biochemical test for Carbohydrate, Lipid and Protein.
- 7- To extract Enzyme from any plant part and demonstrate its activity.

#### **Scheme of Practical**

#### Time: 4 Hrs

Marks: 50

| 1. | Exercise based on plant physiology       |                  |   |
|----|--|------------------|---|
| 2. | Miner Exercise based on plant physiology |                  |   |
| 3. | Comment on plant hormone                 |                  |   |
| 4. | Bio Chemical Test                        |                  | 5 |
| 5. | Spotting- (1-5)                          | 10               |   |
| 6. | Viva- voce                               | 5                |   |
| 7. | Sessional                                | 10<br>Total : 50 |   |



#### B.Sc. Under Graduate Semester wise Syllabus (W.e.f. session 2016 onwards) Class: B.Sc. Semester: V Semester Subject: Chemistry (BSC502T)

Marks 85+15 CCE

#### Unit-I Organic Compounds of Nitrogen:

Preparation, properties and chemical reactions of nitroalkanes and nitroarenes. Mechanism ofnucleophilic substitution in nitroarenes and their reduction in acidic neutral and alkaline media, picric acids. Halonitroarenes; structure and nomenclature, and their activity. Amines structure, and nomenclature, physical properties and stereochemistry, separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Amine salts as phase transfer catalysts. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds, Gabriel – phthalamide reaction, Hoffmann bromamide reaction, Reaction of amines, electrophilic aromatic substitution in aryl amines, reaction of amines with nitrous acid synthetic transformation of aryl diazonium salts, azo coupling.

#### Unit-II

#### Carbohydrates-I

Classification and nomenclature, monosaccharide, mechanism of osazone formation, chain lengthening and chain shortening of aldoses, epimerization, configuration of monosaccharide, erythro, threo diasterioisomers. Formation of glycosides, ethers and esters, determination of ring size of monosaccharide, cyclic structure of D(+) glucose, mechanism of mutarotation. Structure of ribose and deoxyribose.

#### **Carbohydrates-II**

An introduction to glycosidic linkages in di and polysaccharides. Reducing and non-reducing sugars.

#### Unit-III

- (a) **Photochemistry:** Electromagnetic radiation, range of different regions of the spectrum, different expression units for energy, wavelength and frequency Interaction of radiation with matter, difference between thermal and photochemical process. Laws of photochemistry Grotthus-Draper law, Stark-Einstein law, Beer-Lambert law. Electronic transitions, Jablonski diagram depicting various quantum yield.
- (b) UV Spectroscopy: Electronic excitation, elementary idea of instrument used, Application to organic molecules. Woodward-Fieser rule for determining \_max of enes, polyenes and \_, 1- unsaturated carbonyl compounds.

#### **Unit-IV**

#### **Bioinorganic Chemistry - I**

Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin, Biological role of alkali and alkaline earth metal ions with special reference to Ca<sub>2+</sub>.



#### **Bioinorganic Chemistry - II**

Role of metal ions in biological process, nitrogen fixation, oxygen-uptake proteins, cytochromes and ferredoxins.

#### Unit-V

Hard and Soft Acids and Bases (HSAB) Classification of acids and bases as hard and soft, Pearson's HSAB concept, symbiosis.

**Analytical Chemistry:** Errors, their classification, minimization of errors, precision and accuracy, gravimetric estimation - concept, method and precautions, gravimetric estimation of barium and copper.

**Inorganic Polymers:** Introduction and scope of inorganic polymers, special characteristics, classification and their applications. Structure and nature of bonding in Silicones and triphosphonitrilic chloride.

#### **Books suggested:-**

- 1. Physical Chemistry-Puri, Sharma and Pathania, Vikas Publications, New Delhi
- 2. Physical Chemistry -G.M. Barrow, International Student Edition, McGraw Hill.
- 3. The Elements of Physical Chemistry, P.W. Atkins, Oxford Uni v er s i t y Press
- 4. Physical Chemistry, R.A. Alberty, Wiley Eastern Ltd.
- 5. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern
- 6. Organic Chemistry, Morrison and Boyd, Prentice Hall.
- 7. Organic Chemistry, L.G. Wade Jr. Prentice Hall
- 8. Fundamentals of Organic Chemistry Solomons, John Wiley.
- 9. Organic Chemistry, Vol. I, IL IIL S.M. Mukherji, S.P. Singh and R.P. Kapoor,
- 10. Organic Chemistry, F.A. Carey, McGraw-Hill Inc.
- 11. Introduction to Organic Chemistry, Streitwiesser, Heathcock and Kosover, Macmillan.
- 12. Vogel's Qualitative & quantitative Analysis Vol- 1, 2, 3, ELBS.
- 13. Advanced Organic chemistry, I. L. Finar, ELBS.
- 14. Basic Concepts of Analytical chemistry, S M Khopker, New Age International Publishers.
- 15. Analytical Chemistry, R.M. Verma, CBS Publication.
- 16. Analytical Chemistry, Skoog & West, Wiley International.

17. Essentials of Physical Chemistry, B.S. Bahl, Arun Bahl & G.D. Tuli, S. Chand & Company Ltd.

18. Atomic structure and Molecular spectroscopy, Manas Chanda, New Age International Publishers.

- 19. Molecular Spectroscopy, Sukumar, MJP Publishers.
- 20. Organic Chemistry, Mac Murrey, Pearson Education.
- 21. Inorganic Chemistry J.D. Lee, John Wiley
- 22. Inorganic Chemistry Cotton and Wilkinson, John Wiley
- 23. Inorganic Chemistry Huheey, Harper Collins Pub. USA
- 24. Inorganic Polymer G.R. Chhatwal, Himalaya Pub.House
- 25 मध्य प्रदेष हिन्दी ग्रन्थ अकादमी भोपाल द्वारा प्रकाषित रसायन विज्ञान की पाठ्यपुस्तक।
- 26 मध्य प्रदेष हिन्दी ग्रन्थ अकादमी भोपाल द्वारा प्रकाषित प्रायोगिक रसायन की पाउँयपुस्तक।



**M.M. 50** 

B.Sc. Under Graduate Semester wise Syllabus (W.e.f. session 2016 onwards) Class: B.Sc. Semester: - V Semester Subject: Chemistry (BSC502P)

**Time: 6 Hours** 

**Inorganic Chemistry** 12 Marks Analysis of inorganic mixture containing five redicals with at least one interfering radical of typical combination. Gravimetric analysis : 12 Marks Barium as barium sulphate **Organic Chemistry** 12 Marks **Preparation :** (i) Acetylation (ii) **Benzoylation** Meta-Dinitrobenezene (iii) Picric acid (iv) Viva 06 Marks Sessional **08 Marks** 



B.Sc. Under Graduate Semester wise Syllabus (W.e.f. session 2016 onwards) Class: B.Sc. Pharmaceutical Chemistry Semester: V Subject: Pharmaceutical Chemistry-V (BSP504T) Paper: Medicinal Chemistry

Marks: 85+15 CCE

## Unit-I Drug Design & Drug Metabolism

Biotransformation factors affecting Drug metabolism, Pathway of drug metabolism Phase I, Phase II. A general study of the Physio-Chemical Properties in relation to biological activities. Stero Chemistry & drug action isosterism & Bioisosterism, concept of lead compound.

## Unit-II

- (A)**Antibiotics:** Introduction, Classification and user of penicillin and study of structures and uses of streptomycin, neomycine, Kanamycine, tetracycline, SAR and Uses.
- (B) **Antitubercular drugs**: Introduction, synthesis and Mode of Action of PAS, INH, Ethambutol, Ethamide.

## Unit-III

- (A)**Cardiovascular Drug**: Introduction, Classification of Drugs. Cardiovascular disease, Synthesis, Use and side effects of Amyl Nitrate, Sorbirate, Verapamils, Atenolol.
- (B) **Drug acting cardiovascular system**: Cardicglucoside, Antiarrhythmic agent- Antianginal drug, Anti- Hypertensive, Anti-Hyperlipidemic drugs.

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# Unit-IV

- (A)Antiviral: Introduction, Replication and transformation Synthesis and uses of amantididine HCL, Idoxuridine, Methisacene, Anti- HIV Agents.
- **(B)** Antimalarial: Classification, SAR of 4- Antimoquenoline and 8-Animoquenoline, Amiloquine, pamaquine.

# Unit-V

- (A)**Antineoplastic Agent:** Classification, Pathophysiology of cancer, Synthesis and uses 5- fluroreacil, 6- Thioguanine, MOA, and uses, side effects and of Thiotepa, Melaphalan, Busulfn.
- (B) **Antimoebics:** Synthesis and use of Biallyl, Metronidazole, Mentamide, Idoquinol.



B.Sc. Under Graduate Semester wise Syllabus (W.e.f. session 2016 onwards) Class: B.Sc. Pharmaceutical Chemistry Semester: V Subject: Pharmaceutical Chemistry-V (BSP504P) Paper- Medicinal Chemistry

| Examin | ation           | : 4 Hours                                     | Max. Marks: 50 |
|--------|-----------------|---|----------------|
| I.     | Prep            | paration and Synthesis:                       | 12 Marks       |
|        | (i)             | Vicks   |                |
|        | (ii)            | Eosin   |                |
|        | (iii)           | Cold Cream                                    |                |
|        | (iv)            | 7- Hydroxy-4-Methyl Coumarine                 |                |
|        | (v)             | Sodium Chloride injection                     |                |
| II.    | Assa            | 12 Marks                                      |                |
|        | (i)             | Lithium Carbonate                             |                |
|        | (ii)            | Ammonium Chloride                             |                |
|        | (iii)           | Citric Acid                                   |                |
| III.   | Ana             | lysis of Solid dosage froms by Instrumentatio | n: 06 Marks    |
|        | (i)             | Friability                                    |                |
|        | (ii)            | Dissolution time                              |                |
| IV.    | Chromatography: |   | 06 Marks       |
|        | (i)             | TLC   |                |
|        | (ii)            | Colum Chromatography                          |                |
| V.     | Viva            | - Voce:                                       | 06 Marks       |
| VI.    | Prac            | tical Records:                                | 08 Marks       |