



Dr. A.P.J. Abdul Kalam University, Indore (M.P)

B.Sc. Under Graduate Semester wise Syllabus

(W.e.f. session 2016 onwards)

Class: - B.Sc.

Semester: - II Semester

Subject: - Botany (BSB201T)

Paper: - DIVERSITY & SYSTEMATICS OF SEED PLANTS (Phanerogames)

Marks 85+15 CCE

- UNIT-I** **Gymnosperm:** General characters and Classification of Gymnosperms. Heterospory and Origin of Seed Habit. Diversity of Gymnosperm: Geological Time Scale and Fossilization. Fossil Gymnosperms: *Lyginopteris* and *Lagenostoma*.
- UNIT-II** **Gymnosperm:** Morphology, Anatomy Reproduction and life cycle, of *Cycas*, *Pinus* and *Ephedra*.
- UNIT-III** **Taxonomy:** Origin and Evolution of Angiosperms. Terminology for plant description in semi technical language: Principles and rules of Botanical Nomenclature, Herbarium and Botanical gardens; Classification of Angiosperms: Bentham and Hooker, and Hutchinson, Modern trends in Taxonomy.
- UNIT-IV** **Taxonomy:** Diagnostic characteristics and Economic Importance of Families – Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, and Apiaceae.
- UNIT-V** **Taxonomy:** Diagnostic characteristics & Economic Importance of Families – Asteraceae, Asclepiadaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Liliaceae and Poaceae

SUGGESTED READINGS:-

- Agarwal, S.B. 2007. Unified Botany, Shivalal Agarwal & Company Indore.
- Bhatnagar, S. P. and Moitra 1996. Gymnosperms. New Age International Limited, New Delhi.
- Davis, P.H. and Heywood, V.H. 1963, Principles of Angiosperm taxonomy. Oliver and Boyd, London.
- Gangulee, H. C. & Kar, A. K. 2006. College Botany Voll.III, New Central Book Agency (P) Ltd. Kolkata, 700009.
- Heywood, V.H. and Moore, D.M. (eds) 1984. Current concepts in plant taxonomy. Academic press London.
- Jeffery, C. 1982. An Introduction of plant taxonomy. Cambridge University Press Cambridge, London.
- Jones, S.B. Jr. and Luchsinger, A.E. 1986. Plant Systematic. Mc Graw Hill Book Co. New York.



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- Kaushik, M.P. 2003. Modern Textbook of Botany, Prakash Publication Muzaffar Nagar U.P.
- Mukherjee, S.K. 2006. College Botany Voll.II, New Central Book Agency (P) Ltd. Kolkata, 700009.
- Pandey, B. P. 2010. A Text book of Botany- Angiosperms, S. Chand & Company Ltd. Ramnagar, New Delhi- 110055.
- Radford, A.E. 1986. Fundamentals of Plant Systmatics, Happer and Raw, New York.
- Saxena and Sarabhai. 1989. Text book of Botany. Rastogi Publication Meerut.
- Singh, G. 1999. Plant Systematics : Theory and Practice. Oxford and IBH Pvt. Ltd. New Delhi.
- Vasishta, P.C. 2005. Botany for degree students Voll. V, Gymnosperms. S. Chand & Company Ltd. Ramnagar, New Delhi- 11005



Class: - B.Sc.
Semester: - II Semester
Subject: - Botany (BSB201P)

Practical

Objectives

- To develop the skills of section cutting and double staining of vascular plants.
- To familiarize the students with technical terms and methods of describing the plant.
- To impart the skills for identification of plant and assigning to its family.
- To provide the field experiences for Identification of different plants of the families given in the syllabus.

Scheme of Practical Examination Semester II

Time: 4 hrs

Marks- 50

1. Gymnosperms **10**

Exercise based on Morphological and Anatomical study of *Cycas*, *Pinus*, and *Ephedra* .

2. Angiosperms **10**

Technical description of common flowering plant and its identification up to family

3. level

Identification of inflorescence and flower types. **5**

4. Spotting (1-5) **10**

5. Viva- voce **5**

6. Sessional **10**

Total : **50**



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Class: - B.Sc.

Semester: - II Semester

Subject: - Chemistry (BSC202T)

Marks 85+15 CCE

UNIT –I Chemical Kinetics : Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction- concentration, temperature, pressure, solvent, light and catalyst. Dependence of rate on concentration, mathematical characteristics of simple chemical reactions- zero order, first order, second and pseudo order, half life and mean life.

Determination of the order of reaction- differential method, integration method, method of half life period and isolation method. Study of chemical kinetics by polarimetry and spectrometry.

Theories of Chemical Kinetics : effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy. Simple collision theory, transition state theory (equilibrium hypothesis).

UNIT –II A. Thermodynamics

Definition of thermodynamics terms : system, surrounding, Types of systems, intensive and extensive properties State and path functions and their differential. Thermodynamic process. Concept of heat and work.

B. Molecular Orbital Theory

Homonuclear and heteronuclear (CO and NO) diatomic molecules. Multicenter bonding in electron deficient molecules, bond strength and bond energy, Calculation of percentage ionic character from character from dipole moment and electronegativity difference.

C. Ionic solids

Semiconductors, lattice energy and Born- Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarizability of ions. Fajan's rule, Metallic bond, free electron, Valence bond and Band theories.

UNIT –III A. Acids and Bases

Arrhenius, Bronsted- Lowry, solvent system Lewis concepts.



B. Chromatography Techniques

Definition, classifications and principle. Separation of inorganic ions, amino acids and carbohydrates (by paper chromatography and TLC methods).

UNIT – IV : Alkanes

Methods of preparation (with special reference of wurtz, Kolbe, Corey- House reactions and decarboxylation of carboxylic acids). Physical properties and chemical reactions of alkanes. Mechanism of free radical halogenation of alkanes.

Cycloalkanes

Methods of preparations, chemical reactions. Bayer's strain theory and its limitations. Ring strain in cycloalkane and cyclobutanes. Theory of strainless ring.

UNIT V : Dienes

Methods of formation, classification of dienes- isolated, conjugated and cumulated dienes. Butadiene : method of formation , polymerization. Chemical reactions 1, 2 and 1,4 – addition, Diels –alder reaction.

Alkynes

Methods of formation, Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration, oxidation and polymerization.

Alkyl Halides

Nomenclature and classification of alkyl halides, methods of formation, chemical reaction. Mechanism of nucleophilic substitution reaction of alkyl halides, SN1 and SN2 reaction with energy profile diagrams.

Books Suggested :

- Physical Chemistry , R.A. Alberty, Wiley Eastern Ltd.
- Physical Chemistry Through problems, S.K. Dogra and S. Dogra , Wiley Eastern
- Organic Chemistry , Morrison and Boyd, Prentice Hall.
- Organic Chemistry, L.G. Wade Jr. Prentice Hall.
- Fundamentals of Organic Chemistry Solomons, John Wiley.
- Organic Chemistry, Vol. I, I.L. S.M. Mukherji, S.P. Singh and R.P. Kapoor.
- Organic Chemistry, F.A. Carey, McGraw – Hill Inc.
- Introduction to organic Chemistry, Streitwieser, Heathcock and Kosover, Macmillan.
- Vogel's Qualitative & quantitative Analysis Vol-1,2,3, ELBS.
- Advanced organic Chemistry, I.L. Finar, ELBS.
- Basic concepts of Analytical chemistry, R.M. Verma, CBS Publication.



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- Analytical Chemistry Skoog and West, Wiley International
- Essentials of Physical Chemistry, B.S. Bahl, Arun Bahl & G.D. Tuli, S. Chand & Company Ltd.
- Atomic structure and Molecular spectroscopy, Manas Chanca, New Age International Publishers.
- Molecular spectroscopy, Sukumar, MJP Publishers.
- Organic Chemistry, Mac Murrey, Pearson Education.
- Inorganic Chemistry – J.D. Lee, John Wiley.
- Inorganic Chemistry – Cotton and Wilkinson, John Wiley.
- Inorganic Chemistry – Huheey, Harper Collins Pub. USA.
- Inorganic Polymer - G.R. Chhatwal, Himalaya Pub. House.



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Class : B.Sc.

Semester II

Subject : Chemistry (BSC202P)

Max Marks : 50

Duration of practicals during the entire semester : 90 hours

Duration of practical during the semester examination : 4 hours

Inorganic Chemistry

Inorganic mixture analysis 8 Marks

Mixture Analysis for 2 Cations and 2 Anions

Separation of cations by paper chromatography. 4 Marks

Physical Chemistry (Any one) 12 Marks

1. To determine the velocity constant (specific reaction rate) of hydrolysis of methyl acetate / ethyl acetate catalyzed by hydrogen ions at room temperature.
2. To study the effect of acid strength on the hydrolysis of an ester.
3. To compare the strength of HCl and H₂SO₄ by studying the kinetics of hydrolysis of ester.
4. kinetic studies of decomposition of iodided by H₂O₂.(study of iodine clock reaction)

Organic Chemistry : (12 marks)

1. Detection of 2 elements (N, S and halogens) in same organic compound. 6 marks
2. Identification of 2 functional groups in multifunctional organic compound 6 marks

Viva : 6 marks

Records : 8 marks



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Class: - B.Sc.

Semester: - II Semester

Subject: - Pharmaceutical Chemistry (BSP204T)

Paper: - Impurities in Pharmaceutical Substances

Marks 85+15 CCE

UNIT –I Impurities in Pharmaceutical Substances

Sources of impurities in pharmaceutical chemicals, Effect of impurities, Permissible impurities in pharmaceutical substances.

Purification of Pharmaceutical Substances

Methods used to purify Inorganic Substances, Tests of purity, Limit Test- Arsenic, Lead, Sulphate, Iron and Heavy Metals.

UNIT –II Volumetric Estimation

Introduction to volumetric estimation. Conditions, Requirement and Advantages of volumetric analysis. Primary standard and Secondary standard, Methods of expressing concentration in volumetric analysis and numerical based on it.

Titration Methods

Types of titration methods; Acid –Base titrations, Non – aqueous titrations, Oxidation – Reduction titrations, Precipitation titrations, Complexometric titrations.

UNIT III Pharmaceutical Compounds I

Preparation and uses of of : Alum, Aluminium Hydroxide gel, Antimony potassium tartarate, Antimony sodium tartarate injection, Ammoniated mercury, Sodium antimony gluconate.

Preparation and uses of Ammonium chloride, Ammonium bicarbonate, Aromatic spirit of ammonia, Potassium iodide, Potassium permagnate Chlorinated lime.

UNIT IV Pharmaceutical Compounds - II

Preparation, properties and uses of Boric acid, Borax,Plaster of paris, Potassium citrate. Magnesium containing antacids. Dicalcium phosphate, Sodium metaphosphate. Preparation, properties and uses of : Zinc oxide, Sodium benzoate, Lunar caustic (silver nitrate), Sodium fluoride, Potassium acetate, Zinc chloride.

UNIT V Colloidal system and Application

Types of the colloidal system: Emulsions, Gels, Sols (Lyophobic and Lyophilic), Preparation of Lyophobic sols, Multimolecular, Macromolecular and associated coiloids, Protective action of Lyophilic colloids and Gold number, Properties of colloidal solutions : Physical, Mechanical, Optical and electrical. Hardy schulze law and flocculation value, Pharmaceutical application of colloids.



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Class: B.Sc. Pharma Chemistry

Semester: II

Practical (BSP204P)

Paper: Impurities in Pharmaceutical Substances

I. Medicated Preparation :

- (a) Aromatic waters (b) Solutions (c) Syrups (d) Lotions (e) Spirits
- (f) Elixirs (g) Liniments (h) Glycerites (i) Gargles (j) Mouthwashes (k) Inhalations
- (l) Emulsions (m) Suspensions (n) Mucilage (o) Jellies (p) Infusion (q) Decoctions
- (r) Tinctures (s) Milks and Magmas.

II. Volumetric Estimations :

- (a) Oxidation-Reduction titration : Estimations of Ferrous Sulphate in Mohr's salt using
 - (i) KMnO_4 (ii) $\text{K}_2\text{Cr}_2\text{O}_7$
- (b) Strength of Na_2CO_3 in the given mixture of Na_2CO_3 & NaHCO_3 by Titrimetrically

III. Paper Chromatography :

- (a) Separation of Amino acids
- (b) Separation of Plant pigments.

IV. Viva

V. Practical record.