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

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

(Non Grading)

Course Name	Subject	Theory Max. Marks				Practical Max Marks		Total
		Internal		External		Max Marks	Min Marks	
		Max	Min	Max	Min			
Foundation Courses	HINDI+ ENGLISH **FCS 201 HE**	10+05=15	05	50+35=85	28	-	-	100
	E-SHIP **FCS 202 EP**	15	05	35	12	-	-	50
B. Sc. Life Science	BOTANY **BSB 201 T**	15	05	85	28			100
	BOTANY **BSB 201 P**	-	-	-	-	50	17	50
	CHEMISTRY **BSC 202 T**	15	05	85	28	50	17	100
	CHEMISTRY **BSC 202 P**	-	-	-	-	50	17	50
	ZOOLOGY **BSZ 203 T**	15	05	85	28	50	17	100
Total								600

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, Shivlal 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.

- 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

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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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B.Sc. Under Graduate Semester wise Syllabus

(W.e.f. session 2016onwards)

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, salvation energy and solubility of ionic solids, polarizing power and polarizablity of ions. Fazan's rule, Metallic bond, free electron, Valance bond and Band theories.

UNIT –III A. Acids and Bases

Arrhenius, Bronsted- Lowry, solvent system Lewis concepts.

B. Chromatography Techniques

Definition, classifications and principle. Seperation 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 necleophilic addition reactions, hydroboration, oxidation and polymerization.

Alkyl Halides

Nomenclature and classification of alkyl halides, methods of formation, chemical reaction. Mechanism of necleophilic 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, IL IIL S.M. Mukherji, S.P. Singh and R.P. Kapoor.
- Organic Chemistry, F.A. Carey, McGraw – Hill Inc.
- Introduction to organic Chemistry, Streitwiesser, Healthcock 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.
- 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 H_2SO_4 by studying the Kinetics of hydrolysis of ester.
4. kinetic studies of decomposition of iodided by H_2O_2.(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

Subject: Zoology **(BSZ 203T)**

Paper:- Cell biology and Developmental Biology

Marks 85+15 CCE

Unit-I

1. History of Cell Biology.
2. Prokaryotic and eukaryotic Cells.
3. Structure and function of Golgi body, Lysosomes, Endoplasmic Reticulum, Plasma membrane, Mitochondria, Ribosome, Centriole, Microsome.

Unit-II

1. Structure and Function of Nucleus and Nucleous.
2. Structure and Function of Typical Chromosome.
3. Special Type of Chromosome- Lampbrush and Polytene.
4. Cell Cycle, Mitotic and Meiotic cell Division.

Unit-III

1. Spermatogenesis
2. Oogenesis
3. Fertilization
4. Parthenogenesis
5. Regenration.

Unit-IV

Development of Frog

1. Cleavage.
2. Blastulation
3. Fate map construction in frog and chick.
4. Gastrulation and formation of three germinal layers.
5. Structure of Tadpole Larva

Unit-V

Development of Chick

1. Cleavage
2. Blastulation
3. Fate map construction
4. Gastrulation
5. Development of Chick Embryo upto formation of Primitive Steaks
6. Extra embryonic membranes in chick

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Class: B.Sc.
Semester: II
Subject: Zoology (BSZ 203P)

Practical

The Practical's work will be based on theory syllabus and the candidates will be required to show knowledge of the following –

1. Study of Museum Specimens, slides relevant to the type study in theory
2. Smear/ Squash preparation Onion Root tip
3. Exercise related to Frog and Chick Embryology
4. Exercise related to Cell Biology
   a. Stages of Mitotic and Meiotic Cell division
   b. Special Type of Chromosome

Distribution of Marks

Time : 3 hours

Maximum Marks : 50

	Marks Allotted
1. Spotting	10
2. Smear/ Squash preparation	08
3. Exercise related to Chick Embryology (Any 2)	06
4. Exercise related to Cell Biology (Any 2)	06
5. Collection	10
6. Viva- voce	05
7. Practical Record	05
Total	50