Dr. APJ Abdul Kalam University Indore

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

Scheme of Examination

B.Sc.

Semester-III

(w.e.f. July 2017 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 301 HE**	10+05=15	05	50+35=85	28	-	-	100
	Environmental Science **FCS 302 EP**	15	05	35	12	-	-	50
B. Sc. Life Science	BOTANY **BSB 301 T**	15	05	85	28	-	-	100
	BOTANY **BSB 301 P**	-	-	-	-	50	17	50
	CHEMISTRY **BSC 302 T**	15	05	85	28	-	-	100
	CHEMISTRY **BSC 302 P**	-	-	-	-	50	17	50
	ZOOLOGY **BSZ 303 T**	15	05	85	28	-	-	100
	ZOOLOGY **BSZ 303 P**	-	-	-	-	50	17	50
Total								**600**

DR. APJ ABDUL KALAM UNIVERSITY, INDORE

B.Sc. Under Graduate Semester wise Syllabus

(W.e.f. session 2016 onwards)

Class: - B.Sc.
Semester: - III Semester
Subject: - Botany (BSB301T)
Paper: - Structure, Development & Reproduction in Flowering Plants

Marks 85+15 CCE

UNIT-I: - The Root system: Organization of root apex (apical cell theory, histogen theory, korper-kappe theory); quiescent centre; Differentiation of primary and secondary tissues and their role. Anatomy of Monocot and Dicot root. Secondary growth in root. Morphological modification of root for storage, respiration and reproduction. Interaction of root with microbes.

UNIT-II: - The Shoot system: Organization of shoot apex (apical cell theory, histogen theory, tunica corpus theory, plastochrone); Anatomy of Monocot and Dicot Stem: Vascular cambium and its functions, Secondary growth in stem: Characteristics of growth rings: Sapwood and Heart wood, Secondary Phloem, Cork Cambium and Periderm.

UNIT –III: - The Leaf system: Origin and Development of leaf. Diversity in size, shape and arrangement. Internal structure of Dicot and Monocot leaf. Adaptations to photosynthesis and water stress, Senescence and abscission. stomatal complex and diversity of stomata, scale leaves.

UNIT–IV: - Embryology: Concept of flower as a modified shoot. Structure of Anther, Microsporogenesis and Male Gametophyte. Structure of Pistil, Ovules Megasporogenesis and Development of Female Gametophyte (Embryo Sac) and its types. Pollination – Mechanism and Agencies of Pollination, Pollen Pistil interactions and Self incompatibility.

UNIT–V: - Embryology: Double Fertilization and triple fusion. Development and types of endosperm and its morphological nature, Development of Embryo in Monocot and Dicot. Fruit development and maturation. Seed structure and dispersal. Mode of Vegetative Propagation.

Plant Saprophytes A bipolar structure; Onset of polarity; Cytodifferentiation and organogenesis during embryonic development; physiological and genetic aspects.

SUGGESTED READINGS:-

- Gangulee, H.C., Das, K. S. And Dutta, C. 2007. College Botany Voll.I, New Central Book Agency (P) Ltd. Kolkata, 7000

- Hywood, V.H. & Moore, D.M. (eds) 1984. Current concepts in plant taxonomy. Acedemic press London.

- Jones, S.B. Jr. and Luchsinger, A.E. 1986, Plant taxonomy (III edition) Mc Graw Hill Book Co. New York.

- Maheshwari, P.1978. Plant Embryology.

- 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 Systematics, Harper and Row, New York.

- Shrivastava and Das. Modern text book of Botany Vol-III & IV.

- Singh, V., Pande P.C. and Jain , D. K. Structure & Development in Angiosperms. Rastogi Publication, Meerut.

Class:-B.Sc.

Semester: - III Semester

Subject:-Botany (BSB301P)

Objectives

To provide knowledge about structure, development and reproduction in flowering plants.

i) To provide skills of section cutting of angiosperms.

ii) To provide field experiences for studying sources of fire woods, timber yielding and medicinal plants.

iii) To familiarize the students with morphology and anatomy of flowers.

iv) To provide the knowledge of sexual reproduction.

Scheme of Practical Examination Semester III

Time: 4 hrs **Marks: 50**

1- Exercise based on anatomy of root/stem.	10
2- Exercise based on anatomy of leaf.	10
3- Study of shoot apex/root apex/Ovules and Anthers	5
4-Spotting- (1-5)	10
5-Viva- voce	5
6-Sessional	10
Total	50

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

Class: - B.Sc.
Semester: - III Semester
Subject: - Chemistry (BSC302T)
Marks 85+15 CCE

UNIT-I A. Arenes and Aromaticity: Structure of benzene, molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure. MO picture. Aromaticity, the Huckel rule. Aromatic electrophilic substitution, General pattern of the mechanism- Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction and energy profile diagram

B. Aryl Halides: Methods of formation and reactions of aryl halides, Mechanism of nucleophilic aromatic substitution, synthesis and uses of DDT, BHC and Freon.

UNIT-II A. Alcohols: Classification and nomenclature.
1. Monohydric alcohols: nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acid, and esters, acidic nature, reactions of alcohols.
2. Dihydric Alcohols:
Nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [Pb(OAc)4, and HIO4] and pinacol-pinacolone rearrangement.
3.Trihydric alcohols - nomenclature and methods of formation, chemical reaction of glycerol.

B. Phenols:
Nomenclature, structure and methods of formation, acidic character. Comparative acidic strength of alcohols and phenols, stabilization of phenoxide ion by resonance, acylation and carboxylation Mechanisms of Fries rearrangements, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Manasse reaction and Riemer-Tiemann reaction.

UNIT III

A. Chemistry of elements of I transition series: Characteristics properties of d-block elements. Properties of the elements of the first transition series, their binary compounds such as carbides, oxides and sulphides. Complexes illustrating relative stability of their oxidation states, coordination number and geometry.

B. Chemistry of elements of II and III transition series: General characteristics comparative study of **II and III transition series** with 3d-analogues respect to ionic radii, oxidation states, magnetic behavior, spectral properties and stereochemistry.

UNIT IV

A. Coordination Compounds: IUPAC Nomenclature, Isomerism EAN Concept, Chelates, VBT of transition metal complexes, its limitations. Crystal field theory, Crystal Field Stabilization Energy, spectro chemical series, limitations of CFT.

B. Thermochemistry: Standard state, standard enthalpy of formation: Hess's Law of heat summation and its vapplication. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization.

Second Law of Thermodynamics: Need for the law, Different statements of the law, Carnot cycle and its efficiency. Carnot theorem. Thermodynamic scale of temperature. Lectures

UNIT V

A. **Thermodynamics: Concept of entropy:** entropy as a state function, entropy as a function of P & T, entropy change in physical change, Clausius inequality, entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

B. **Third Law of Thermodynamics:** Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data, Gibbs and Helmholtz functions, Gibbs function (G) and Helmholtz function (A) as a thermodynamic quantities, A and G as a criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change, relative variation of G & A with P, V & T.

C. **Buffers:** Mechanism of buffer action, Henderson-Hazel equation, Hydrolysis of salts

Class: B.Sc. Semester III

Subject: **Chemistry (BSC302)**

Paper: Practical

Inorganic Chemistry **18 marks**

1. Calibration of the fractional weights, pipettes and burettes.
2. Preparation of standard solutions. Dilution of 0.1 M to 0.01 M Solutions.

(a) Determination of acetic acid in commercial vinegar using NaOH.

(b) Determination of alkali content- antacid tablet using HCl.

(c) Estimation of calcium content in chalk as calcium oxalate by permagnatometry. (d) Estimation of hardness of water by EDTA.

Complex Compound Preparation:

1. Diaquabis(methyl acetoacetato) nickel(II)
2. Diaquabis (nethyl acetoacetato) cobalt (II)
3. Bis(methl acetoacetato) copper (II) monohydrate
4. Potassium chlorochromate (IV)
5. Tetraamminecopper(II) sulphate monohydrate
6. Hexaamminenickel(II) chloride

Organic Chemistry Laboratory Techniques **18 marks**

A. Thin layer chromatography
Determination of R_f values and identification of organic compounds.

(a) Separation of green leaf pigments (spinach leaves may be used)

(b) Preparation and separation of 2, 4- dinitrophenylhydrazones of acetone, 2-butanone, hexane-2 and 3-one using toluene and light petroleum (40:6).

(c) Separation of a mixture of dyes using cyclohexane and ethylacetate.(8:5:1.5).

B. Paper chromatography : Ascending and Circular

Determination of R_f values and identification of organic compounds.

(a) Separation of a mixture of phenylalanine and glycine, alanine and aspartic acid. Spray reagent ninhydrin.

(b) Separation of mixture of DL-alanine, glycine and L-lucine using n-butanol: acetic acid : water (4:1:5). Spray reagent ninydrin.

(c) Separation of monosaccharides- a mixture of D-galactose and D-

fructose using n-butanol : acetone : water (4:1:5). Spray reagent- aniline hyddrogen pthalate.

Viva **6 marks**

Sessional **8 marks**

B.Sc. Under Graduate Semester wise Syllabus

(W.e.f. session 2016 onwards)

Class: - B.Sc.

Semester: - III Semester

Subject:-Zoology (BSZ 303T)

Title of Paper: Vertebrates & Evolution

Marks 85+15 CCE

Unit-1

1.Origin of Chordates Classification of phylum Chordata upto orders according to Parker and Haswell (Latest edition).

2. Urochordata – Type study of Herdmania.

3.Cephalochordata – Type study of Amphioxus. Affinities of Amphioxus.
4.

4.Comparison between Petromyzon and Myxine.

Unit-2

1. Comparative account of integuments

2. Comparative account of limb bones and girdles of vertebrates (Amphibia, Reptiles, Birds and Mammals).

3. Comparative account of digestive system. (Amphibia, Reptiles, Birds and Mammals).

4. Comparative account of respiratory system. (Amphibia, Reptiles, Birds and Mammals).

Unit-3

1.Comparative account of aortic arches and
heart. 2.Comparative account of brain
3.Comparative account of Urinogenital system
4.Placentation in mammals.

Unit-4

1.Origan of life- modern concepts
only 2.Lamarckism, Darwinism.
3.Modern synthetic theories: Variations, Mutation, Isolation &
speciation 4.Adaptation and mimicry
5.Micro, macro evolution and mega evolution.

Unit-5

1. Fossils, methods of fossilization, determination of age of fossils.

2. Study of extinct forms: Dinosaurs and Archaeopteryx.

3. Zoogeographical distribution.

4. Evolution of man.

5.Geological time scale and Insular fauna.

Class: - B.Sc.

Semester:- III Semester

Subject: - Zoology (BSZ 303P)

Practical

1. Major and minor dissection of commercially available species of local fishes/ rat (Efforts may be done to use computer simulation technique).
2. Study of museum specimens (Vertebrates)
3. Study of specimens of evolutionary importance viz living fossils, connecting links, extinct animals, fossils: Limulus, Latimeria, Dianosaurs, Asciatic Chital, Archeopteryx, Peripatus,etc.
4. Osteology: Limb bones and girdle bones.
5. Study of Geological time scale chart.
6. Study of Histological Slides (Vertebrates).

Distribution of Marks

Time 3 hours **Maximum Marks: 50**

	Marks Allotted
1. Major dissection	08
2. Minor dissection	04
3. Spotting	16
4 Identification and comments upon bones (any two)	04
5. One spot showing evolution/ Exercise	04
6. Mounting	04
7. Viva –voce	05
8. Record	05
	Total 50