



Dr. APJ Abdul Kalam University Indore

Scheme of Examination

B.Sc.

Semester-III

(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 301 HE	10+05=15	05	50+35=85	28	-	-	100
	Environmental Science FCS 302 EP	15	05	35	12	-	-	50
B.Sc. Pharma Chemistry	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
	PHARMA CHEMISTRY BSP304 T	15	05	85	28	-	-	100
	PHARMA CHEMISTRY BSP304 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.



DR. APJ ABDUL KALAM UNIVERSITY, INDORE

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



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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 [$\text{Pb}(\text{OAc})_4$, and HIO_4] 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 application. 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-Hassel equation, Hydrolysis of salts



Time : 6 hours

Subject : Chemistry

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-leucine 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 hydrochloride.

Viva

6 marks

Sessional

8 marks



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B.Sc. Under Graduate Semester wise Syllabus

(w.e.f. session 2016 onwards)

Class: - B.Sc.

Semester: - III Semester

Subject: - Pharma Chemistry (BSP304T)

Paper: - Medicinal Chemistry

Marks 85+15 CCE

UNIT-I

General Anesthetics : Definitions, Stages of Anesthesia, Classification and Theories of General Anesthetics, Preparation, Mode of action, Therapeutic uses and Adverse Effects of Compound – Thiopentals Sodium, Halothane, Cyclopropane

Local Anesthetics : Definitions, Classification and Theories of Local Anesthetics (five Theories), Preparation, Mode of action Therapeutic uses and Adverse Effects of compound Procaine Benzocaine, Lignocaine HCL, Dipeperdon HCL.

UNIT-II

Hypnotics and Sedatives : Definitions, Classification and Structure Activity Relationship of barbiturates, Preparation, Mode of action, Therapeutic uses and adverse effect of compounds- barbitone Sodium, Allobarbiton, Hexabarbitons, Glutethimide:

Tranquillizers: Definition, Classifications, Preparation, Mode of Action, Therapeutic use and adverse effect of compounds – Chlorpromazine HCL, Chlordiazepoxide Diazepam.

Anticonvulsants: Definition, Classification, Preparation, Mode of action, Therapeutic uses and adverse effect of compounds – Phenobarbital, Phenytoin.

UNIT-III

Antihypertensive : General Introduction, causes and types of hypertension Classification of antihypertensive, mode of action of calcium channel blockers Preparation, Mode of action, Therapeutic uses and Adverse effect of Compound – Tolazoline HCL Propranolol HCL, Methyl Dopa, Guanethidine sulphate, Captopril

Adrenergic Agents : Classification Adrenergic hormone, Structure Activity Relationship of Phenylethylamine HCL.

Cholinergics and Anticholinesterases : Preparation, Mode of action, Therapeutic uses and Adverse effect of compounds – Acetylcholine, Carbachol Edrophonium, Pyridostigmine



UNIT-IV

Non Steroidal Anti-Inflammatory Drugs : Definitions , Types of Pain , Classification of NSAID, Structure Activity Relationship of Indole Acetic Acid derivatives , Structure Activity Relationship of Salicylic acid derivatives .

Preparation , Mode of action ,Therapeutic uses and adverse effect of Compounds – Indomethacin , Tolmetin Sodium .

Diuretics : Classification of Diuretics ,Preparation , Mode of action ,Therapeutic uses and Adverse effect of Compound – Furosemide ,Acetazolamide ,Chlorthiamide ,Spironolactone .

UNIT-V

Drugs Acting on Respiratory Systems , Expectorants and Antitussives: Classification and Mechanism of action , Potassium glucosulphate , Terpine hydrate Noscopine .

Antiasthmatics Drugs : Classification ,causes of Asthama , Preparation , Mode of action , Therapeutic uses and Adverse Effect of Compound – Salbutamol ,Terbutaline .

Autocoids :Histaminics and Antihistaminics , Chemistry of histamine ,Pharmacological action of histamines Classification of antihistaminics ,Structure Activity Relationship of Ethanolamine derivatives Diphenylhydramine HCL Mepyramine maleate.

BOOKS RECOMMENDED

1. Ashutosh kar, Medicinal chemistry ,New Age International (P) Limited,Publishers.
2. G.R.Chatwal ,Pharmaceutical Chemistry Organic Vol.II, Himalaya Publishing House , Bombay .
3. Dr.J.L. Jain,Fundamentals of Biochemistry , S.Chand &Company Ltd .New Delhi.
4. F .S. K.Barar ,Essentials of Pharmacotherapeutics , S. Chand & Company Ltd .New Delhi.
5. R. S.Gaud and Dr. G.D.Gupta , Practical Pharmaceuticals CBS Publishers and Distributors , .New Delhi
6. Harkishan sing , V.K.Kapoor, Organic Pharmaceuticals Chemistry ,Vallabh Prakashan Delhi.
7. Harkishan sing , V.K.Kapoor, Medicinal Pharmaceuticals Chemistry ,Vallabh Prakashan Delhi.
8. John H.Block ,John M.Beak ,Jr. Organic Medicinal and Pharmaceuticals Chemistry ,Lippincot Williams and Wilkins .
9. Stenlake & Beckett , Pharmaceuticals Chemistry Part I, CBS Publishers and Distributors , .New Delhi
10. O.P. Agrawal ,Advanced Organic Practical, Goyal Publishing House , Meerut (U.P)
11. Dr. C.S.Shah ,Dr.J.S.Qadry ,Pharmacognosy ,B.S. Shah Prakashan.
12. R .S.Santoshkar ,S.Bhandarkar , S.S.Ainapuri ,Pharmacology & Pharmacotherapeutics popular Prakashan Mumbai.
13. Paul M Dewick . , Medicinal natural products (A biosynthesus approach)II edition.



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14. Ashutosh kar Pharmacognosy & Pharmacobiotech ,New Age International (P) Limited ,Publishers.
15. Vogel ,A.I.A Textbook of , Practical Organic Chemistry ELBS/ Longman ,London.



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Practical

III Semester

B.Sc. - Pharma Chemistry (BSP304P)

Examination : 4 hours

I Preparation of Organic Compounds : 12Marks

- (a) Phenyl Benzoate (b) 1- Phenyl Azo – β naphthol (c) Phthalimide
(d) Benzanilide (e) Hippuric Acid (f) Naphthyl acetate (g) Succinic anhydride
(h) Di-azo-amino benzene (i) 2,4-Dinitro toluene (j) 2,4,6-Tribromo aniline (k) p- acetanilide

II Isolation : 12Marks

- (a) Starch from potatoes (b) Hippuric from Cow's urine
(c) Calcium citrate from Lemon juice (d) Solanin from potatoes.

III Identification of Plant Potatoes. 06Marks

III Identification of Drugs 06 Marks

IV Viva –voce 06 Marks

V Practical record 08 Marks