BOARD OF STUDIES
IN
B.Sc BOTANY

2021-2022

DEPARTMENT OF BOTANY AND HORTICULTURE

SYLLABUS FOR B.Sc BOTANY

PITHAPUR RAJAH'S GOVERNMENT COLLEGE

Autonomous and Accredited with 'A' Grade by NAAC (3.17 CGPA)

KAKINADA – 533 001, E G Dist., ANDHRA PRADESH

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA,

Department of Botany and Horticulture

The Board of Studies meeting for **Botany** subject during the academic year 2021-2022 is conducted at the Dept. of Botany & Horticulture on **November2021** with Dr. Ch.JohnSamuel, Lecturer in-Charge in the chair along with the following members.

Name, Designation and Address **Signature**

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1. **Chair Person:**
   Dr. Ch.JOHN SAMUEL
   Lecturer in-Charge
   Dept. of Botany & Horticulture
   PRGC(A),
   Kakinada

2. **AdiKavi Nannaya University Nominee:**
   Dr. J.SUNITHA,
   Principal
   GDC Kovvur
   Mobile: 9441050910
   E-mail: drjsuneetha@gcrjy.ac.in

3. **Members Nominated by Executive Council of the College:**

   a. **Subject Expert 1:**
      Dr. K.V.V.G.K.VARA PRASAD
      Lecturer in Botany
      GDC(A), Tuni
      Mobile: 9908876727
      E-mail: prasadkommula03@gmail.com

   b. **Subject Expert 2:**
      Dr. G.JYOTHIRMAYI
      Lecturer in Botany
      GDC(A), Rajamahendravaram
      Mobile: 7989171117
      E-mail: drgjbotanymr@gmail.com

   c. **Member from Research Organization:**
      Smt P.SWATHI
      Assistant Director,
      Biological Control Laboratory
      Dept. of Agriculture, Kakinada
      Mobile: 9848350962
      E-Mail: swathi3002@yahoo.com

Name, Designation and Address **Signature**

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d. Alumni Member:

Dr. D R SALOMI SUNEETHA
Professor & Head
Plant Physiology, Biochemistry & Microbiology Dept.
College of Horticulture
Dr YSR Horticultural University
Venkatramannagudem-534101 W.G Dist
Mobile: 9491608088
Email: salomibiochem@gmail.com

4. Members from the College:

a. Faculty member:

1. **Smt. SARA PALAPARTHY**
   Lecturer in Botany
   PRGC(A), Kakinada
2. **Dr. M.KRISHNA RAO**
   Lecturer in Botany
   PRGC(A), Kakinada
3. **P.RAJESH**
   Guest Faculty

b. Student members:

1.	Reshma	III BZC
2.	Lakshmi Narasamma	III BZC
3.	Sunandha	III HBC
4.	Sri sai Charan	III HBC

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF BOTANY & HORTICULTURE

Programme: B.Sc Botany

Objectives of the Programme of B.Sc Botany

1. To create Awareness on all cryptogams
2. To enhance the knowledge about diversity in all cryptogams
3. To create awareness on economic importance of Algae, Fungi, Bryophyta, Pteridophyta
4. To study about Structure and diseases and control methods of plant diseases caused by viruses, bacteria
5. To study about anatomy of plant tissues
6. To study about anomalous secondary growth in different plants
7. To create awareness on classification on flowering plants
8. To study about morphology and floral characters of some flowering plants
9. To know the importance of flowering plants around the habitat
10. To increase the ability of analysis of plant species with classification
11. To create awareness on economic importance of flowering plants
12. To study about the plant embryo formation and development
13. To study about development of plant from embryo
14. To study about the growth and development of plant
15. To Study and observation of absorption of water through roots
16. To enhance the knowledge by observation of osmosis, diffusion
17. To study of Metabolism like photosynthesis, respiration
18. To study about Ecology, population, Community
19. To study about cell biology, genetics
20. To study about geographical distribution of plants
21. To study about medicinal values of different plants

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF BOTANY & HORTICULTURE

Program Outcomes (PO):

- PO1.**Critical Thinking**: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
- PO2.**Effective Communication**: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- PO3. **Social Interaction**: Elicit views of others, mediate disagreements and help reach conclusions in group settings.
- PO4. **Ethics**: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
- PO5. **Environment and Sustainability**: Understand the issues of environmental contexts and sustainable development.
- PO6. **Self-directed and Life-long Learning**: Acquire the ability to engage in independent and life-long learning in the broadest context socio- technological changes
- PO7.**SKILL DEVELOPMENT**: Acquire the knowledge of practical ability in handling apparatus and process of methodology

Program Specific Outcomes (PSO):

- PSO1. Understand the nature and basic concepts of cell biology, Biochemistry, Taxonomy and ecology.
- PSO2. Analyze the relationships among animals, plants and microbes
- PSO3. Perform procedures as per laboratory standards in the areas of Biochemistry, Bioinformatics, Taxonomy, Economic Botany and Ecology

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF BOTANY & HORTICULTURE

COURSE OUTCOMES

SEMESTER - 1
CO1: The structure in relation to function of cells the fundamental unit of life, are concerned in this course along with molecular present in cells and the flow they make the basic framework of cells and their continuity
CO2: awareness created on diversity on Algae, Fungi
CO3: knowledge created on microbial diversity

SEMESTER – 2
CO1: Diversified plant groups in vascular cryptogams
CO2: Deals with flowering seeded plants with economic importance
CO3: Analyze the tissue systems and their structural and functional role
CO4: deals with secondary growth of some important plants

SEMESTER – 3
CO1: fundamental components of taxonomical study
CO2: Nomenclature of flowering plants and their distribution
CO3: Complete knowledge about important families like Cucurbitaceae, Rutaceae, etc.
CO4: Total awareness gained from plant embryology

SEMESTER – 4
CO1: knowledge about the metabolism of plant
CO2: awareness of absorption of water in plants
CO3: aware with the mechanism of photosynthesis, respiration in plants
CO4: knowledge developed about phytoharmonal regulations and photo periodism

SEMESTER - 5
CO1: knowledge created about ecological plant species, ecotypes
CO2: awareness created about geographical distribution of plant species
CO3: detailed study about ultra-structure of cell is possible
CO4: plant genome study in structural and functional aspect is possible

SEMESTER – 6
CO1: Study about tissue culture methods and applications are extensively studied with application point of view CO2: Plant biotechnology reveals new trends in plant
CO1: Study about tissue culture methods and applications are extensively studied with application point of view CO2: Plant biotechnology reveals new trends in plant sciences this was extensively studied
CO3: Diversified plants are studied extensively
CO4: Ornamental plants study is possible
CO5: Secondary metabolites are studied from phytochemistry
CO6: Medicinal plants are extensively studied from different species of plants

Year	Paper	Semester	Title of the Paper	Marks	Credits
I YEAR	I	I	FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS	50+50	3
		I	PRACTICAL	50	2
	II	II	BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY	60+40	3
		II	PRACTICAL	50	2
II YEAR	III	III	PLANT TAXONOMY AND EMBRYOLOGY	60+40	3
		III	PRACTICAL	50	2
	IV	IV	PLANT PHYSIOLOGY AND METABOLISM	60+40	3
		IV	PRACTICAL	50	2
III YEAR	V	V	CELL BIOLOGY, GENETICS AND PLANT BREEDING	60+40	3
		V	PRACTICAL	50	2
		VI	PLANT ECOLOGY & PHYTOGEOGRAPHY	60+40	3
		VI	PRACTICAL	50	2
	VI	VII ELECTIVE	PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS	60+40	3
		VII ELECTIVE	PRACTICAL	50	2
		VIII-A-1	ECONOMIC BOTANY	60+40	3
		VIII-A-1	PRACTICAL	50	2
		VIII-A-2	ETHNOBOTANY AND MEDICINAL BOTANY	60+40	3
		VIII-A-2	PRACTICAL	50	2
		VIII-A-3	PHARMACOGNOSY AND PHYTOCHEMISTRY	60+40	3
			PROJECT	50	2

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF BOTANY & HORTICULTURE

BOTANY COURSE STRUCTURE AND SYLLABUS

Botany Model Blue Print for the Question paper and choice for I, II & III Years (w.e.f. 2021-22 Academic Year)

S.No	Type of Questions	To be given in the Question paper			To be Answered		
		No. of Questions	Marks Allotted to each Question	Total marks	No. of Questions	Marks Allotted to each Question	Total marks
1	SECTION-A ESSAY QUESTIONS (EQ)	5	10	50	3	10	30
2	SECTION-B SHORT ANSWER QUESTIONS (SAQ)	5	5	25	4	5	20
Total Questions & Total Marks =		**10**	**-**	**75**	**7**	**-**	**50**

$$\textbf{Percentage of choice given} = \frac{75 - 50}{100} \times 100 = \frac{25}{100} \times 100 = 25$$

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., -Botany-I/ I Semester End (W.E.F. 2021-22)
FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS
(COURSE: BO1207)

Total hours of Teaching 60hrs @ 4 hrs/week Total Credits:03

UNIT – I: ORIGIN OF LIFE AND VIRUSES 12 Hrs.

1. Origin of life, concept of primary Abiogenesis; Miller and Urey experiment. Five kingdom classification of R.H. Whittaker
2. Discovery of microorganisms, Pasteur experiments, germ theory of diseases.
3. Shape and symmetry of viruses; structure of TMV and Gemini virus; multiplication of TMV; A brief account of Prions and Viroid's.
4. A general account on symptoms of plant diseases caused by Viruses. Transmission of plant viruses and their control.
5. Significance of viruses in vaccine production, bio-pesticides and as cloning vetor, Structure and functions of Scanning Electron Microscope, Transmission Electron Microscope.

UNIT – II: SPECIAL GROUPS OF BACTERIA AND EUBACTERIA 12 Hrs.

1. Brief account of Archaebacterial, Actinomycetes and Cyanobacteria.
2. Cell structure and nutrition of Eubacteria.
3. Reproduction- Asexual (Binary fission and endospores) and bacterial recombination (Conjugation, Transformation, Transduction).
4. Economic importance of Bacteria with reference to their role in Agriculture and industry (fermentation and medicine).
5. A general account on symptoms of plant diseases caused by Bacteria; Citrus canker,

UNIT – 3: FUNGI & LICHENS 12 Hrs.

1. General characteristics of fungi and Ainsworth classification (upto classes).
2. Structure, reproduction and life history of (a) Rhizopus (Zygomycota) and (b) Puccinia (Basidiomycota).
3. Economic uses of fungi in food industry, pharmacy and agriculture.
4. A general account on symptoms of plant diseases caused by Fungi; Blast of Rice,
5. Lichens- structure and reproduction; ecological and economic importance.

UNIT – 4: ALGAE 12 Hrs.

1. General characteristics of Algae (pigments, flagella and reserve food material); Fritsch classification (upto classes).
2. Thallus organization and life cycles in Algae.
3. Occurrence, structure, reproduction and life cycle of (a) Oedogonium (Chlorophyceae) and (b) Polysiphonia (Rhodophyceae).
4. Economic importance of Algae.

UNIT – 5: BRYOPHYTES 12 Hrs.

1. General characteristics of Bryophytes; classification upto classes.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of (a) Marchantia and (b) Funaria (Bryopsida).
3. General account on evolution of sporophytes in Bryophyta.

Text books:

- Botany – I (Vrukshasastram-I): Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) College Botany, Volume-I, S. Chand Publishing, New Delhi
- Hait,G., K.Bhattacharya&A.K.Ghosh (2011) A Text Book of Botany, Volume-I, New Central Book Agency Pvt. Ltd., Kolkata
- Bhattacharjee, R.N., (2017) Introduction to Microbiology and Microbial Diversity, Kalyani Publishers, New Delhi.

Books for Reference:

- Dubey, R.C. & D.K.Maheswari (2013) A Text Book of Microbiology,S.Chand& Company Ltd., New Delhi
- Pelczar Jr., M.J., E.C.N. Chan &N.R.Krieg (2001)Microbiology, Tata McGraw-Hill Co, New Delhi
- Presscott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata McGraw – Hill Co. New Delhi.
- Alexopoulos, C.J., C.W.Mims & M.Blackwell (2007) Introductory Mycology,Wiley& Sons, Inc., New York
- Mehrotra, R.S. & K. R. Aneja (1990) An Introduction to Mycology. New Age International Publishers, New Delhi
- Kevin Kavanagh (2005) Fungi; Biology and Applications John Wiley & Sons, Ltd.,West Sussex, England
- John Webster & R. W. S. Weber (2007) Introduction to Fungi, Cambridge University Press, New York
- Fritsch, F.E. (1945) The Structure & Reproduction of Algae (Vol. I & Vol. II) Cambridge University Press Cambridge, U.K.
- Bold, H.C. & M. J. Wynne (1984) Introduction to the Algae, Prentice-Hall Inc., New Jersey
- Robert Edward Lee (2008) Phycology. Cambridge University Press, New York
- Van Den Hoek, C., D.G.Mann & H.M.Jahns (1996)Algae : An Introduction to Phycology. Cambridge University Press, New York
- Shaw, A.J.&B.Goffinet (2000)Bryophyte Biology. Cambridge University Press, New York.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., BOTANY PRACTICAL PAPER – I PRACTICAL SYLLABUS
FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS

Total hours of laboratory Exercises 30 hrs @ 2 per week Total credits:02

PRACTICAL SYLLABUS:

1. Knowledge of Microbiology laboratory practices and safety rules.
2. Knowledge of different equipment for Microbiology laboratory (Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, Laminar air flow chamber and Incubator) and their working principles. (In case of the non-availability of the laboratory equipment the students can be taken to the local college/clinical lab. with required infrastructural facilities or they can enter a linkage with the college/lab for future developments and it will fetch credits during the accreditation by NAAC).
3. Demonstration of Gram's staining technique for Bacteria.
4. Study of Viruses (Corona, Gemini and TMV) using electron micrographs/ models.
5. Study of Archaebacteria and Actinomycetes using permanent slides/ electron micrographs/diagrams.
6. Study of Anabaena and Oscillatoria using permanent/temporary slides.
7. Study of different bacteria (Cocci, Bacillus, Vibrio and Spirillum) using permanent or temporary slides/ electron micrographs/ diagrams.
8. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts:
    a. Algae: Volvox, Oedogonium, Ectocarpus and Polysiphonia
    b. Fungi: Rhizopus and Puccinia
    c. Lichens: Crustose, foliose and fruiticose
    d. Bryophyta: Marchantia and Funaria
9. Study of specimens of Tobacco mosaic virus, Citrus canker and Blast of Rice.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., Botany Practical Examinations at the End of Semester-I
FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS
Botany Practical Model Paper-I (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

1. Take the T.S. of material 'A' (Fungi), make a temporary mount and make comments about identification. 10 M
2. Identify any 2 algae from the mixture (material 'B') given with specific comments about identification. 10 M
3. Take the T.S. of material 'C' (Bryophyta), make a temporary mount and make comments about identification. 10 M
4. Identify the following with specific reasons. 4 x 3 = 12 M
   D. A laboratory equipment of Microbiology
   E. Virus
   F. Archaebacteria /Ascomycete /Cyanobacteria/ Eu-Bacteria
   G. Lichen
5. Record + Viva-voce 5 + 3 = 08 M

Suggested co-curricular activities for Botany Core Course-1 in Semester-I:

A. Measurable:

a. Student seminars:

1. Baltimore classification of Viruses.
2. Lytic and lysogenic cycle of T- even Bacteriophages.
3. Viral diseases of humans and animals.
4. Retroviruses
5. Bacterial diseases of humans and animals.
6. Significance of Bacteria in Biotechnology and Genetic engineering.
7. Fungi responsible for major famines in the world.
8. Poisonous mushrooms (Toad stools).
9. Algae as Single Cell Proteins (SCPs)
10. Parasitic algae
11. Origin of Bryophytes through: Algae vs Pteridophytes
12. Fossil Bryophytes
13. Evolution of gametophytes in Bryophyta
14. Ecological and economic importance of Bryophytes.

b. Student Study Projects:

1. Isolation and identification of microbes from soil, water and air.
2. Collection and identification of algae from fresh /estuarine /marine water.
3. Collection and identification of fruiting bodies of Basidiomycetes and Ascomycetes.
4. Collection and identification of Lichens from their native localities.
5. Collection of diseased plants/parts and identification of symptoms.

6. Collection and identification of Bryophytes from their native localities.

c. Assignments: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

B. General:

1. Visit to Agriculture and/or Horticulture University/College/Research station to learn about microbial diseases of plants.
2. Visit to industries working on microbial, fungal and algal products.
3. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I Year B.Sc., Degree Examinations at I Semester End
Botany Paper I: FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS
(Course: BO1207 Model Paper w.e.f. 2021-22)

Time: $2_{1/2}$ Hrs. **Max. Marks: 50**

PART – I

3 × 10 M = 30

Answer any **THREE** of the following by choosing atleast one question from each Part.

SECTION – A

1. Write about Transmission of plant diseases caused by viruses and their control
2. Explain about economic importance of bacteria
3. Explain about Lichen structure and reproduction

SECTION – B

1. Describe the sexual reproduction in Polysiphonia
2. Describe the sexual reproduction in Marchantia
3. Write about Lichen structure and reproduction

PART – II

4 × 5 M = 20

Answer any **FOUR** of the following Questions

1. Germ theory of diseases
2. Archaebacteria
3. Economic importance in fungi
4. Economic importance of Lichens
5. Cystocarp
6. Protonema

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	LAQ	SAQ	Marks allotted to the Module
UNIT – I: ORIGIN OF LIFE AND VIRUSES	**1**	**1**	**15**
UNIT – II: SPECIAL GROUPS OF BACTERIA AND EUBACTERIA	**1**	**1**	**15**
UNIT – 3: FUNGI & LICHENS	**2**	**2**	**30**
UNIT – 4: ALGAE	**1**	**1**	**15**
UNIT – 5: BRYOPHYTES	**1**	**1**	**15**
Total Marks Allotted To All Questions Including Choice			**90**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc-Botany-I/ I Semester End (W.E.F. 2021-22)
FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS
I B.Sc-Botany-I/ I Semester Question Bank

UNIT – I: ORIGIN OF LIFE AND VIRUSES

Essay Questions

1. Write about Five kingdom classification
2. Explain about Transmission of plant viruses and their control
3. Write about Miller & Urey experiment
4. Write about significance of Viruses in vaccines and biopesticides

Short Answer Questions

1. Viroid
2. Prions
3. Germ theory of diseases
4. Pasteur's experiment

UNIT – II: SPECIAL GROUPS OF BACTERIA AND EUBACTERIA

Essay Questions

1. Write about sexual reproduction in Bacteria
2. Write about economic importance of Bacteria
3. Describe the Cell structure of Eubacteria

Short Answer Questions

1. Archaebacteria
2. Cyanobacteria
3. Citrus canker

UNIT – III: FUNGI & LICHENS

Essay Questions

1. Write about Lichen structure and reproduction
2. Describe the life cycle of Puccinia on wheat plant
3. Describe the sexual reproduction in Rhizopus
4. Explain about general characters and classification of Fungi

Short Answer Questions

1. Spermogonium
2. Blast of rice
3. Economic importance of Fungi
4. Ecological importance of Lichens

UNIT – IV: ALGAE

Essay Questions

1. Write about thallus organization in Algae
2. Describe the sexual reproduction in Polysiphonia
3. Explain the general characters and classification of Algae
4. Describe the sexual reproduction in Oedogonium

Short Answer Questions

1. Pigments in Algae
2. Economic importance of Algae
3. Cystocarp

UNIT – V: BRYOPHYTES

Essay Questions

1. Describe the reproduction in Marchantia
2. Explain about evolution of sporophytes in Bryophytes
3. Describe the structure of Funaria capsule

Short Answer Questions

1. Protonema
2. Gemma cup
3. Marchantia T.S.of Thallus

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., -Botany-II/ II Semester End (W.E.F. 2021-22)
BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY (COURSE: BO2207)
Total hours of Teaching 60hrs @ 4 hrs/week Total Credits:03

UNIT – I: PTERIDOPHYTES **12 Hrs.**

1. General characteristics of Pteridophyta; classification of Smith (1955) up to divisions.
2. Occurrence, morphology, anatomy, reproduction and life history of (a) Lycopodium (Lycopsida) and (b) Marsilea (Filicopsida).
3. Stelar evolution in Pteridophytes;
4. Heterospory and seed habit.

UNIT – II: GYMNOSPERMS **14 Hrs.**

1. General characteristics of Gymnosperms; Sporne classification upto classes.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) Cycas (Cycadopsida) and (b) Gnetum (Gnetopsida).
3. Outlines of geological time scale.
4. A brief account on Cycadeoidea.

UNIT – III: BASIC ASPECTS OF TAXONOMY **13 Hrs.**

1. Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus and family. Taxonomioc Keys.
2. Plant nomenclature: Binomial system, ICBN- rules for nomenclature.
3. Herbarium and its techniques, BSI herbarium and Kew herbarium; concept of digital herbaria.
4. Bentham and Hooker system of classification; Engler&Prantl Classification
5. Systematic description and economic importance of the following families:
   (a) Annonaceae (b) Curcurbitaceae

UNIT – IV: SYSTEMATIC TAXONOMY **13 Hrs.**

1. Systematic description and economic importance of the following families:
   (a) Asteraceae (b) Asclepiadaceae (c) Amaranthaceae (d) Euphorbiaceae
   (e) Arecaceae and (f) Poaceae g)Orchidaceae
2. Outlines of Angiosperm Phylogeny Group (APG IV).

UNIT – V: PHYTOGEOGRAPHY **08 Hrs.**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Endemism – types and causes.
3. Phytogeographic regions of India.
4. Vegetation types in Andhra Pradesh.

TEXT BOOKS:

- Botany – I (Vrukshasastram-I): Telugu Akademi, Hyderabad
- Botany – II (Vrukshasastram-II): Telugu Akademi, Hyderabad
- Acharya, B.C., (2019) Archchegoniates, Kalyani Publishers, New Delhi
- Bhattacharya, K., G. Hait & Ghosh, A. K., (2011) A Text Book of Botany, Volume-II, New Central Book Agency Pvt. Ltd., Kolkata
- Hait,G., K.Bhattacharya&A.K.Ghosh (2011) A Text Book of Botany, Volume-I, New Central Book Agency Pvt. Ltd., Kolkata
- Pandey, B.P. (2013) College Botany, Volume-I, S. Chand Publishing, New Delhi
- Pandey, B.P. (2013) College Botany, Volume-II, S. Chand Publishing, New Delhi

BOOKS FOR REFERENCE:

- Smith, G.M. (1971) Cryptogamic BotanyVol. II., Tata McGraw Hill, New Delhi
- Sharma,O.P.(2012)Pteridophyta. Tata McGraw-Hill, New Delhi
- Kramer, K.U.&P. S. Green (1990) The Families and Genera of Vascular Plants, Volume –I: Pteridophytes and Gymnosperms(Ed.K.Kubitzki) Springe-Verlag, New York
- Bhatnagar, S.P. &AlokMoitra (1996) Gymnosperms. New Age International, New Delhi
- Coulter, J.M. &C.J.Chamberlain (1910) Morphology of Gymnosperms, The University of Chicago Press, Chicago, Illinois
- Govil, C.M. (2007) Gymnosperms: Extinct and Extant. KRISHNA Prakashan Media (P) Ltd.Meerut& Delhi
- Sporne, K.R.(1971)The Morphology of Gymnosperms.Hutchinsons Co. Ltd., London
- Arnold, C.A., (1947) An introduction to PaleobotanyMcGraw –Hill Book Company,INC, New York
- Stewart,W.N., and G.W.Rothwell (2005) Paleobotany and the evolution of plants Cambridge University Press, New York
- Lawrence, George H.M. (1951) Taxonomy of Vascular Plants. The McMillan Co., New York
- Heywood, V. H. and D. M. Moore (1984)Current Concepts in Plant Taxonomy. Academic Press, London.
- Jeffrey, C. (1982)An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge. London.
- Sambamurty, A.V.S.S. (2005)Taxonomy of Angiosperms I. K .International Pvt. Ltd., New Delhi
- Singh, G. (2012). Plant Systematics: Theory and Practice.Oxford & IBH Pvt. Ltd., NewDelhi.
- Simpson, M.G. (2006). Plant Systematics. Elsevier Academic Press, San Diego, CA,U.S.A.
- Cain, S.A . (1944)Foundations of Plant GeographyHarper & Brothers, N.Y.
- Good, R. (1997)The Geography of flowering Plants (2nd Edn.)Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi
- Mani, M.S (1974)Ecology & Biogeography of IndiaDr. W. Junk Publishers, The Haque

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., BOTANY PRACTICAL PAPER – II PRACTICAL SYLLABUS
BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY

Total hours of laboratory Exercises 30 hrs @ 2 per week Total credits:02

PRACTICAL SYLLABUS:

1. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts:
   a. Pteridophyta: Lycopodium and Marselia
   b. Gymnosperms: Cycas and Gnetum
2. Study of fossil specimens of Cycadeoidea and Pentoxylon (photographs /diagrams can be shown if specimens are not available).
3. Demonstration of herbarium techniques.
4. Systematic / taxonomic study of locally available plants belonging to the families prescribed in theory syllabus. (Submission of 30 number of Herbarium sheets of wild plants with the standard system is mandatory).
5. Mapping of phytogeographical regions of the globe and India.
6. Mapping of Phytogeographical regions of Andhra Pradesh

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., Botany Practical Examinations at the End of Semester-II
BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY
Botany Practical Model Paper-I (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

1. Take T.S. of the material 'A' (Pteridophyta), make a temporary slide and justify the identification with apt points. 10 M
2. Take T.S. of the material 'B' (Gymnosperms), make a temporary slide and justify the identification with apt points. 10 M
3. Describe the vegetative and floral characters of the material 'C' (Taxonomy of Angiosperms) and derive its systematic position. 10 M
4. Identify the specimen 'D' (Fossil Gymnosperm) and give specific reasons. 05 M
5. Locate the specified phytogeographical regions (2x2M) in the world / India (E) map supplied to you. 04 M
6. Record + Herbarium & Field note book + Viva-voce 5 + 4 + 3 = 12 M

Suggested co-curricular activities for Botany Core Course-2 in Semester-II:

A. Measurable:

a. Student seminars:

1. Fossil Pteridophytes.
2. Aquatic ferns and tree ferns
3. Ecological and economic importance of Pteridophytes
4. Evolution of male and female gametophytes in Gymnosperms.
5. Endemic and endangered Gymnosperms.
6. Ecological and economic importance of Gymnosperms.
7. Floras and their importance: Flora of British India and Flora of Madras Presidency.
8. Botanical gardens and their importance: National Botanic garden and Royal Botanic garden.
9. Artificial, Natural and Phylogenetic classification systems.
10. Molecular markers used in APG system of classification.
11. Vessel less angiosperms.
12. Insectivorous plants.
13. Parasitic angiosperms.
14. Continental drift theory and species isolation.

b. Student Study Projects:

1. Collection and identification of Pteridophytes from their native locality/ making an album by collecting photographs of Pteridophytes.
2. Collection and identification of Gymnosperms from their native locality/ making an album by collecting photographs of Gymnosperms.
3. Collection of information on famous herbaria in the world and preparation of a report.
4. Collection of information on famous botanic gardens in the world and preparation of a report.
5. Collection of data on vegetables (leafy and fruity) plants in the market and preparation of a report on their taxonomy.
6. Collection and identification of fresh and dry fruits plants in the market and preparation of a report on their taxonomy.

7. Collection of data on plants of ethnic and ethnobotanical importance from Their native locality.
8. Preparation of a local flora by enlisting the plants of their native place.

c. Assignments: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

B. General:

1. Visit to Botanic garden in a Research institute/University to see the live plants.
2. Virtual tour in websites for digital herbaria and botanic gardens.
3. Acquaint with standard floras like – Flora of Madras Presidency, Flora of their respective district in Andhra Pradesh.
4. Looking into vegetation of different phytogeographical regions using web resources.
5. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I Year B.Sc., Degree Examinations at II Semester End
Botany Paper II: BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY OF PLANTS
(Course: BO2207 Model Paper w.e.f. 2021-22)

Time: $2_{1/2}$ Hrs. **Max. Marks: 50**

SECTION – A

3 × 10 = 30 M

Answer any **THREE** of the following by choosing atleast one question from each Part.

PART - I

1. a) Explain stelar evolution in Pteridophytes
   OR
   b) Describe the reproduction in Marselia
2. a) Describe the sexual reproduction in Cycas
   OR
   b) General characters of Gymnosperms
3. a) Write about Bentham & Hooker classification
   OR
4. b) Explain systematic description of Cucurbitaceae

PART - II

5. a) Explain detailed account of Euphorbiaceae
   OR
   b) Expain systematic description of Asclepiadaceae
6. a) Write about phytogeography regions in India
   OR
   b) Explain about Endemism

SECTION – B

4 × 5 = 20 M

Answer any **FOUR** of the following Questions

1. Marsilea Petiole
2. Seed habit
3. General characters of Gymnosperms
4. Economic importance of Poaceae
5. Floral Characters of Cucurbitaceae
6. Gnetum male cone
7. Binomial system
8. Phytogeography distribution

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	LAQ	SAQ	Marks allotted to the Module
UNIT – I: PTERIDOPHYTES	**1**	**2**	**20**
UNIT – II: GYMNOSPERMS	**1**	**2**	**20**
UNIT – III: BASIC ASPECTS OF TAXONOMY	**1**	**2**	**20**
UNIT – IV: SYSTEMATIC TAXONOMY	**1**	**2**	**20**
UNIT – V: PHYTOGEOGRAPHY	**1**	**2**	**20**
Total marks allotted to all questions including choice			**100**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc-Botany-II/ II Semester End (W.E.F. 2021-22)
Botany Paper II: BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY
I B.Sc-Botany-II/ II Semester Question Bank

UNIT – I: PTERIDOPHYTES

Essay Questions

1. Write about stelar evolution in Pteridophytes.
2. Write about Marselia reproduction .
3. Write about Lycopodium sexual reproduction

Short Answer Questions

1. Lycopodium stem anatomy.
2. Marsilea Rhizome.
3. Seed habit
4. Marsilea petiole
5. Heterospory

UNIT – II: GYMNOSPERMS

Essay Questions

1. Write about general characters of Gymnosperms
2. Describe the reproduction in Cycas
3. Describe the reproduction in Gnetum

Short Answer Questions

1. Cycas male cone.
2. Cycas female cone
3. L.S of Cycus Ovule.
4. Gnetum male cone
5. Gnetum ovule.

UNIT – III: BASIC ASPECTS OF TAXONOMY

Essay Questions

1. Explain the Bentham & Hooker Classification
2. Write about systematic description of Cucurbitaceae
3. Write about Herbarium Preparation & its Significance

Short Answer Questions

1. Floral characters of Annonaceae
2. Outlines of APG-IV
3. Typification
4. Binomial System

UNIT – IV: SYSTEMATIC TAXONOMY

Essay Questions

1. Write about systematic description of Amaranthaceae
2. Write about systematic description of Euphorbiaceae
3. Write about systematic description of Asclepiadaceae

Short Answer Questions

1. Economic importance of Asteraceae.
2. Floral characters of Poaceae
3. Economic importance of Aracaceae
4. Subfamilies in Asclepiadaceae

UNIT – V: PHYTOGEOGRAPHY

Essay Questions

1. Explain about Phytogeographic regions in World
2. Explain about Phytogeographic regions in India
3. Explain about Endemism

Short Answer Questions

1. Vegetation types in AP
2. Phytogeography distribution

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., -Botany-III / III Semester End (W.E.F. 2021-22)

Anatomy, Embryology of Angiosperms, Plant Ecology and Biodiversity

Total hours of Teaching 60hrs @ 4 hrs/week Total Credits:03

Learning outcomes:

- On successful completion of this course, the students will be able to;
- Understand on the organization of tissues and tissue systems in plants.
- Illustrate and interpret various aspects of embryology.
- Discuss the basic concepts of plant ecology, and evaluate the effects of environmental and biotic factors on plant communities.
- Appraise various qualitative and quantitative parameters to study the population and community ecology.
- Correlate the importance of biodiversity and consequences due to its loss.
- Enlist the endemic/endangered flora and fauna from two biodiversity hot spots in India and assess strategies for their conservation.

Unit – 1: Anatomy of Angiosperms 12 Hrs.

1. Organization of apical meristems: Tunica-carpus theory and Histogen theory.
2. Tissue systems–Epidermal, ground and vascular,Special tissue.
3. Anomalous secondary growth in *Boerhaavia, Dracaena*
4. Study of timbers of economic importance - Teak, Red sanders and Rosewood.

Unit – 2: Embryology of Angiosperms 12 Hrs.

1. Structure of anther, anther wall, types of tapetum. Microsporogenesis and development of male gametophyte.
2. Structure of ovule, Megaspoorogenesis; types of embryo sacs- monosporic (*Polygonum*), bisporic (*Allium*) and tetrasporic (*Peperomia*)
3. Outlines of pollination, pollen – pistil interaction and fertilization.
4. Endosperm - Types and biological importance - Free nuclear, cellular,helobialand ruminate.
5. Development of Dicot (*Capsella bursa-pastoris*)

Unit – 3: Basics of Ecology 12 Hrs.

1. Ecology: definition, branches and significance of ecology.
2. Ecosystem: Concept and components, energy flow, food chain, food web, ecological pyramids.
3. Eotypes, Ecotone and Ecads.
4. Plants and environment: Climatic (light and temperature), edaphic and biotic factors.
5. Ecological succession: Hydro sere and Xerosere.

Unit – 4: Population, Community and Production Ecology 12 Hrs.

1. Population ecology: Natality, Mortality, growth curves, ecotypes, ecads
2. Community ecology: Frequency, density, cover, life forms, biological spectrum
3. Concepts of productivity: GPP, NPP and Community Respiration
4. Secondary production, P/R ratio and Ecosystems.
5. Carbon foot printing

Unit – 5: Basics of Biodiversity 12 Hrs.

1. Biodiversity: Basic concepts, Convention on Biodiversity - Earth Summit.
2. Value of Biodiversity; types and levels of biodiversity and Threats to biodiversity
3. Biodiversity Hot spots in India. Biodiversity in North Eastern Himalayas and Western Ghats.
4. Principles of conservation: IUCN threat-categories, RED data book
5. Role of NBPGR and NBA in the conservation of Biodiversity.
6. Role of Biodiversity board to protect Biodiversity of A.P

Text books:

- Botany – III (Vrukshasastram-I): Telugu Academy, Hyderabad Botany – IV (Vrukshasastram-II): Telugu Academy, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-II,* S. Chand Publishing, New Delhi Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi
- Bhattacharya, K., G. Hait & Ghosh, A. K., (2011) *A Text Book of Botany, Volume- II,* New Central Book Agency Pvt. Ltd., Kolkata

Books for Reference:

- Esau, K. (1971) *Anatomy of Seed Plants.* John Wiley and Son, USA.
- Fahn, A. (1990) *Plant Anatomy*, Pergamon Press, Oxford.
- Cutler, D.F., T. Botha & D. Wm. Stevenson (2008) *Plant Anatomy: An Applied Approach,* Wiley, USA.
- Paula Rudall (1987) *Anatomy of Flowering Plants: An Introduction to Structure and Development.* Cambridge University Press, London
- Bhojwani, S. S. and S. P. Bhatnagar (2000) *The Embryology of Angiosperms (4th Ed.),*Vikas Publishing House, Delhi.
- Pandey, A. K. (2000) *Introduction to Embryology of Angiosperms*. CBS Publishers & Distributors Pvt. Ltd., New Delhi
- Maheswari, P. (1971) *An Introduction to Embryology of Angiosperms*. McGraw Hill Book Co., London.
- Johri, B.M. (2011) *Embryology of Angiosperms.* Springer-Verlag, Berlin
- Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi
- Bhattacharya, K., A. K. Ghosh, & G. Hait (2011) *A Text Book of Botany, Volume- IV,* New Central Book Agency Pvt. Ltd., Kolkata
- Kormondy, Edward J. (1996) *Concepts of Ecology,* Prentice-Hall of India Private Limited, New Delhi
- Begon, M., J.L. Harper & C.R. Townsend (2003) *Ecology,* Blackwell Science Ltd., U.S.A.
- Eugene P. Odum (1996) *Fundamentals of Ecology*, Natraj Publishers, Dehradun
- Sharma, P.D. (2012) *Ecology and Environment*. Rastogi Publications, Meerut, India.
- N.S. Subrahmanyam & A.V.S.S. Sambamurty (2008) *Ecology Narosa* Publishing House, New Delhi
- K. Agrawal& P.P. Deo (2010) *Plant Ecology*, Agrobios (India), Jodhpur
- Kumar, H.D. (1992) *Modern Concepts of Ecology (7th Edn.,)* Vikas Publishing Co.,
- New Delhi.
- Newman, E.I. (2000): *Applied Ecology*Blackwell Scientific Publisher, U.K.
- Chapman, J.L&M.J. Reiss (1992): *Ecology - Principles & Applications.*Cambridge
- University Press, U.K.
- Kumar H.D. (2000) *Biodiversity & Sustainable Conservation* Oxford & IBH Publishing Co Ltd. New Delhi.
- U. Kumar (2007) *Biodiversity: Principles & Conservation,* Agrobios (India), Jodhpur

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

II B.Sc., Practical syllabus of Botany Core Course – 3 /Semester – III

Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity

(Total hours of laboratory exercises 30 Hrs. @ 02 Hrs./Week)

Practical Syllabus

1. Tissue organization in root and shoot apices using permanent slides.
2. Anomalous secondary growth in stems of *Boerhavia* and *Dracaena*.
3. Study of anther and ovule using permanent slides/photographs.
4. Study of pollen germination and pollen viability.
5. Dissection and observation of Embryo sac haustoria in *Santalum*or*Argemone.*
6. Structure of endosperm (nuclear and cellular) using permanent slides / Photographs.
7. Dissection and observation of Endosperm haustoria in *Crotalaria* or *Coccinia*.
8. Developmental stages of dicot and monocot embryos using permanent slides / photographs.
9. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, rain gauze, and lux meter. (visit to the nearest/local meteorology station where the data is being collected regularly and record the field visit summary for the submission in the practical).
10. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (02 each).
11. Quantitative analysis of herbaceous vegetation in the college campus for frequency, density and abundance.
12. Identification of vegetation/various plants in college campus and comparison with Raunkiaer's frequency distribution law.
13. Find out the alpha-diversity of plants in the area
14. Mapping of biodiversity hotspots of the world and India.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

II B.Sc., Botany Practical Examinations at the End of Semester-III

Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity

Botany Practical Model Paper-III (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

1. Take T.S. of the material 'A' (Anatomy),	
prepare a temporary slide and justify the identification with specific reasons.	1 X 10 = 10 M
2. Write the procedure for the experiment 'B' (Embryology)	
and demonstrate the same	1 X 10 = 10 M
3. Take T.S. of the material 'C',	
prepare a temporary slide and justify the identification with specific reasons.	1 X 10 = 10 M
4. Identify the following with specific reasons.	4 x 3 = 12 M
D. Anatomy/Embryology	
E. Ecology instrument	
F. Mapping of Biodiversity hot spot	
G. Endemic/endangered plant/animal	
5. Record + Viva-voce	5 + 3 = 8 M
	50 M

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc-Botany-III/ III Semester End (W.E.F. 2021-22)
ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY
II B.Sc-Botany-III Semester Question Bank

UNIT – I: PLANT ANATOMY

Essay Questions.

1 Write an essay on Shoot Apical Meristem?
2 Write an essay on Complex Tissues
3 Explain the anomalous secondary growth in stem of Boerhaavia ?
4 Explain the anomalous secondary growth in stem of Dracaena ?

Short Answer Questions

1 Histogen Theory
2 Tunica Carpus Theory
3 Teak wood
4 Red Sanders
5 Rose Wood
6 Latisiferous Tissue

Very Short Answers Questions

1 Amphiphloic vascular bundles
2 Phellem
3 Bark
4 Bast Fibres
5 Cork cambium
6 Pith
7 Sieve tube

UNIT – II: EMBRYOLOGY OF ANGIOSPERMS

Essay Questions.

1. Describe the types of embryosac and their development
2. Give an account of Microsporogenesis in Angiosperms
3 Give an account of fertilization in Angiosperms.

Short Answer Questions

1. Pollen Pistil Interaction
2. Entomophily
3. Nuclear Endosperm
4. Helobial Endosperm
5. Dicot Embryo
6. Megasporogenesis
7. Types of Ovules

Very Short Answer Questions

1. Caruncle
2. Tapetum
3. Endothecium
4. Polygonum
5. Synergids
6. Generative Cell
7. Allium type
8. Double fertilization
9. Chalazogamy
10. Circirnotropus Ovule
11. Obturator
12. Poly embryony

UNIT –III: Basics of Ecology.,

Essay Questions

1. What is an Ecosystem? Describe the different components of an Ecosystem?
2. Define Ecology, its branches and significance of Ecology?
3. Describe the role of Light as an ecological factors?

Short Answer Questions

1 Effect of temperature on vegetation?
2 Biotic factors
3 Food chain
4 Food web
5 Hydrosere
6 Ecological pyramids

Very Short Notes

1 Vegetation
2 Succession
3 Habitat
4 Ecesis
5 Climax Community
6 Consumers
7 Productivity
8 Ecosystem
9 Biome

UNIT –IV: Population &Community Ecology

Essay Questions

1. Explain about Community Ecology?

2. Explain about Population Ecology?
3. Explain Production Ecology?

Short Questions

1. Ecotypes
2. Competition
3. Frequency
4. Growth curves
5. Natality and mortality
6. Life forms

Very Short Notes.

1. Population
2. Vitality
3. Mortality
4. Density
5. Frequency
6. Ecards
7. Vigour
8. Geophytes/ Cryptophytes
9. Biological spectrum

UNIT- V: Basics of Biodiversity

Essay Questions

1. Explain the levels of biodiversity
2. Explain the Biodiversity hotspots in India
3. Explain the conservation principles of biodiversity?

Short Questions

1. Earth summit
2. Threat to biodiversity
3. Endemic species of india
4. Western ghats
5. North eastern Himalayas
6. Red data book

Very Short Notes.

1. Biodiversity
2. Alfa diversity
3. Beta diversity
4. Gamma Diversity
5. Genetic Diversity
6. Species Diversity
7. Hotspots
8. IUCN
9. UNEP
10. WWF
11. NBPGR

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II Year B.Sc., Degree Examinations at III Semester End
Botany Paper III: ANATOMY AND EMBYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY
(Course: BO4207 Model Paper w.e.f. 2021-22)

Time: $2_{1/2}$ Hrs. **Max. Marks: 60**

SECTION – A **3 × 10 =30 M**

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary

PART –I

1. A) Write an essay on shoot Meristems?
   Or
   B) Explain the anomalous secondary growth in stem Boerhaavia?

2. A) Describe the types of Embryosacs.?
   Or
   B) Give an account of Microsporogenesis in Angiosperms?

3. A) What is an Ecosystem? Describe the different components of an Ecosystem?
   Or
   B) Describe the role of Light as an ecological Factor ?

PART – II

4 A) Explain about Community Ecology?
OR
B) Explain about Population Ecology

5 A) Explain the levels of Biodiversity
Or
B) Explain the Biodiversity Hotspots in India

SECTION – B **4 × 5=20 M**

Answer Any **FOUR** Of The Following Questions, Draw Neat And Labeled Diagrams Wherever Necessary

1. Histogen theory
2. Nuclear Endosperm
3. Biotic factors
4. Growth curves
5. Threat to Biodiversity
6. Red Data Book
7. Ecotypes

8. Ecological Pyramids

SECTION – C **5 × 2=10 M**

Answer Any FIVE Questions

1. Phellem
2. Apomixis
3. Sucession
4. Vitality
5. Alpha diversity
6. NBPGR
7. Emigration
8. Climax community
9. Synergids
10. Caruncle

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
UNIT – I: ANATOMY OF ANGIOSPERMS	**1**	**2**	**2**	**20**
UNIT –II: EMBROLOGY OF ANGIOSPERMS	**1**	**2**	**2**	**20**
UNIT –III: BASICS OF ECOLOGY	**1**	**2**	**2**	**20**
UNIT – IV: POPULATION, COMMUNITY AND PRODUCTION	**1**	**2**	**2**	**20**
UNIT –V: BASICS OF BIODIVERSITY	**1**	**2**	**2**	**20**
Total marks allotted to all question including choice				**100**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., -Botany-IV/ IV Semester End (W.E.F. 2021-22)
PLANT PHYSIOLOGY AND METABOLISM (COURSE: BO4207)
Total hours of Teaching 60hrs @ 4 hrs/week Total Credits:03

UNIT – 1: PLANT-WATER RELATIONS (10 Hrs)

1. Importance of water to plant life, diffusion, imbibition, osmosis. water potential, osmotic potential, pressure potential.
2. Ascent of sap
3. Transpiration: stomata structure and mechanism of stomatal movements (K+ ion flux).
4. Mechanism of phloem transport; source-sink relationships.

UNIT – II: Mineral Nutrition, Enzymes And Respiration (14 Hrs.)

1. Essential macro and micro mineral nutrients and their role in plants; symptoms of mineral deficiency
2. Absorption of mineral ions; passive and active processes.
3. Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action, enzyme kinetics.
4. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, Pentose Phosphate Pathway (HMP shunt)

UNIT – III: Photosynthesis and Photorespiration (12 Hrs)

1. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect
2. Concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation
3. Carbon assimilation pathways (C3,C4 and CAM);
4. Photorespiration - C2 pathway

UNIT – IV: Nitrogen and lipid metabolism (12 Hrs.)

1. Nitrogen metabolism: Biological nitrogen fixation – asymbiotic and symbiotic nitrogen fixing organisms. Nitrogenase enzyme system.
2. Lipid metabolism: Classification of Plant lipids, saturated and unsaturated fatty acids.
3. Anabolism of triglycerides, β-oxidation of fatty acids, Glyoxylate cycle.

Unit – V: Plant growth - development and stress physiology (12 Hrs)

1. Growth and Development: Definition, phases and kinetics of growth.
2. Physiological effects of Plant Growth Regulators (PGRs) - auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids.
3. Physiology of flowering:Photoperiodism, role of phytochrome in flowering.
4. Seed germination and senescence; physiological changes.

Text books:

- Botany – IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) College Botany, Volume-III, S. Chand Publishing, New Delhi ¬
- Ghosh, A. K., K. Bhattacharya &G. Hait (2011)
- A Text Book of Botany, VolumeIII, New Central Book Agency Pvt. Ltd.
- , Kolkata Books for Reference: ¬ Aravind Kumar & S.S. Purohit (1998)
- Plant Physiology – Fundamentals and Applications,AgroBotanica,
- Bikaner ¬ Datta, S.C. (2007) Plant Physiology,New Age International (P) Ltd.,
- Publishers, New Delhi ¬ Hans Mohr & P. Schopfer (2006)Plant Physiology, Springer (India) Pvt. Ltd., New Delhi ¬ Hans-Walter heldt (2005) Plant Biochemistry,Academic Press, U.S.A. ¬ Hopkins, W.G. & N.P.A. Huner (2014)Introduction to Plant Physiology,
- Wiley India Pvt. Ltd., New Delhi ¬ Noggle Ray & J. Fritz (2013)Introductory Plant Physiology,
- Prentice Hall (India), New Delhi ¬ Pandey, S.M. &B.K.Sinha (2006)Plant Physiology, Vikas Publishing House, New Delhi ¬ Salisbury, Frank B. & Cleon W. Ross (2007)Plant Physiology,
- Thomsen & Wadsworth, Austalia&U.S.A ¬ Sinha, R.K. (2014) Modern Plant Physiology,
- Narosa Publishing House,New Delhi ¬ Taiz, L.&E. Zeiger (2003)Plant Physiology, Panima Publishers, New Delhi ¬ Verma,
- V.(2007)Text Book of Plant Physiology,Ane Books India, New Delhi

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., BOTANY PRACTICAL PAPER – IV PRACTICAL SYLLABUS
PLANT PHYSIOLOGY AND METABOLISM

Total hours of laboratory Exercises 30 hrs @ 2 per week Total credits:02

Suggested Laboratory Exercises:

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of *Rhoeo / Tradescantia.*
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method
5. Demonstration of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of photosynthesis under varying Co_2 concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmott' bubbler.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., Botany Practical Examinations at the End of Semester-IV
(PLANT PHYSIOLOGY AND METABOLISM)
Botany Practical Model Paper-IV (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

1. Experiment '**A**' Major experiment from Plant-Water relations / Plant metabolism **15M**

   Scheme of valuation:

Aim, Principle and Procedure	-	5M
Conduct of Experiment	-	6M
Report of result and inference	-	4M

2. Experiment 'B' Minor Experiment **7M**

   Scheme of valuation:

Aim, Principle and Procedure	-	5M
Report of result and inference	-	2M

3. Scientific observation and data analysis 4×5=**20M**

   D. Plant-Water relations
   E. Mineral nutrition and Enzymes
   F. Plant metabolism
   G. Plant growth and development

   Scheme of valuation:

Identification	-	1M
Diagram	-	1M
Reasons/analysis	-	1M

4. Record & Viva-voce 5+3=**08M**

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II Year B.Sc., Degree Examinations at IV Semester End
Botany Paper IV: PLANT PHYSIOLOGY & METABOLISM
(Course: BO4207 Model Paper w.e.f. 2021-22)

Time: $2_{1/2}$ Hrs. **Max. Marks: 60**

SECTION – A **3 × 10 =30 M**

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary

PART –I

4. a) What is Transpiration? Describe the mechanism of opening and closing of stomata.
   OR
   b) What is meant by ascent of sap? Explain this biophysical process with Cohesion - Tension Theory.
5. a) Write essay on general characters of Enzymes.
   OR
   b) Give a detailed note on biological nitrogen fixation in Rhizobium
6. a) Describe the mechanism of C3 Pathway.
   OR
   b) Write an Essay on Photophosphorylation.

PART – II

7. a) Give a detailed note on Glycolysis.
   OR
   b) Write an Essay on Electron transport system
8. a) Give a Detailed note on Photoperiodism
   OR
   b) Write an Essay on Phytohormones.

SECTION – B **4 × 5=20 M**

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

9. Apoplast and Simplast
10. Transcription.
11. Photosynthetic pigments.
12. Types of Lipids.
13. Role of Auxins in Agriculture.
14. Vernalisation
15. Anaerobic Respiration
16. Importance Water in plant Metabolism

SECTION – C **5 × 2=10 M**

Answer **any five** Questions

11. Aquaporins
12. Polysomes

13. Chemo osmosis
14. Alpha- Oxidation
15. Florigen
16. Water potential
17. Chlorosis
18. Redox
19. ATP ase complex
20. Bolting

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
UNIT – I: PLANT – WATER RELATIONS	**1**	**2**	**2**	**20**
UNIT –II: MINERAL NUTRITION & ENZYMES	**1**	**2**	**2**	**20**
UNIT –III: PHOTOSYNTHESIS	**1**	**2**	**2**	**20**
UNIT – IV: PLANT RESPIRATION & LIPID METABOLISM	**1**	**2**	**2**	**20**
UNIT –V: GROWTH AND DEVELPOMEMNT	**1**	**2**	**2**	**20**
Total marks allotted to all question including choice				**100**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., -Botany-IV/ IV Semester End (W.E.F. 2021-22)
PLANT PHYSIOLOGY AND METABOLISM
II B.Sc., -Botany-4/ IV Semester Question Bank

UNIT – I: PLANT – WATER RELATIONS

Essay Questions

1. What is meant by ascent of sap? Explain this biophysical process with Cohesion - Tention Theory.
2. What is Transpiration? Describe the mechanism of opening and closing of stomata.
3. Describe the Mechanism of water absorption in plants. Add a note on factors affecting rate of water absorption.

Short notes.

1. Importance Water in Plant Metabolism
2. Apoplast and Simplast
3. Significance of Transpiration.

Very Short notes.

1. Diffusion
2. Imbibition
3. Water potential
4. Osmosis
5. Plasmolysis
6. Pressure potential
7. Guttation
8. Aquaporins

UNIT –II: MINERAL NUTRITION & ENZYMES

Essay Questions.

1. What are essential elements? Explain the role of Macro nutrients in plant Nutrition.
2. Give a Detailed note on Biological nitrogen fixation in Rhizobium
3. Describe the Mechanism of Enzyme action.

Short notes.

1. Classification of Enzymes
2. Transcription.
3. Translation.

Very Short notes.

1. Prosthetic group
2. Macronutrients
3. Hydroponics
4. Chlorosis
5. Trace elements
6. Active transport
7. Polysomes
8. t-RNA
9. Translation

UNIT –III: PHOTOSYNTHESIS

Essay Questions.

1. Write an essay on Photophasporelatoin.
2. Describe the mechanism of C3 Pathway.
3. Desribe the mechanism of CAM pathway.

Short notes.

1. Photosynthetic pigments.
2. Source -Sink relationships.
3. Photorespiration

Very Short notes.

1. Chemo osmosis
2. Emerson's enhancement effect
3. Trans cellular theory
4. Electro osmotic theory
5. Photo system
6. Photosynthetic bacteria
7. Photo phosphorylation
8. CAM
9. Dark phase
10. Redox

UNIT – IV: PLANT RESPIRATION & LIPID METABOLISM

Essay Questions

1. Give a detailed note on Glycolysis.
2. Write an Essay on Electron transport system
3. Write about Oxidative Phosphorilation

Short notes

1. Types of Lipids.
2. TCA cycle
3. Anaerobic Respiration

Very Short notes.

1. EMP – Pathway
2. Mitochondria
3. Fermentation
4. Respiratory quotient
5. Anaerobic respiration
6. Terminal oxidation
7. Energitics ofBeta-oxidation
8. Gluconeogenesis
9. Alpha- Oxidation
10. ATPase complex

UNIT –V: GROWTH AND DEVELOPMENT

Essay Questions.

1. Write an Essay on Phytohormones.
2. Give a Detailed note on Photoperiodism

Short notes.

1. Vernalisation.
2. Brassinosteroids.
3. Role of Auxins in Agriculture
4. Effect of salt stress on plants.

Very Short notes.

1. Apical dominance
2. Anti-gibberellin
3. Triple response growth
4. Epinasty
5. Halophytes
6. Photo period
7. Bolting
8. Richmand – Lang effect
9. Florigen
10. Vernalization

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany- V Semester End (W.E.F. 2021-22)
CELL BIOLOGY, GENETICS AND PLANT BREEDING

Total hours of Teaching 40hrs @ 3 hrs/week Total Credits:03

UNIT – I: Cell Biology (12h)

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall and cell membranes.
3. Chromosomes**:** morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.

UNIT – II: Genetic Material: (12h)

1. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
2. Types of RNA (mRNA, tRNA, rRNA), their structure and function.
3. Polymorphism of DNA.

UNIT – III: Mendelian Inheritance: (12h)

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosomal mapping – 2-point & 3-point test cross.
3. Linkage: concept, complete and incomplete linkage, linkage mapping,
4. Crossing Over: concept & significance, Mitotic Crossing over.

UNIT – IV: Plant Breeding: (12h)

1. Introduction and Objectives of plant breeding.
2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

UNIT – V: Breeding, Crop Improvement and Biotechnology: (12h)

1. Role of mutations in crop improvement.
2. Role of soma clonal variations in crop improvement.
3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

Suggested activity: Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Genetics problems.

Books for Reference:

- Old, R.W. and Primrose S.B. 1994, Principles of Gene Manipulation Blackwell Science, London
- Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York.
- Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London.
- Power C.B., 1984, Cell Biology, Himalaya Publishing Co. Mumbai
- De. Robertis and De Robertis, 1998, Cell and Molecular Biology, K.M. Varghese and Company
- Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958): Principles of Genetics (5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London.
- Winchester, A.M. (1958): Genetics (3rd Edition) Oxford & IBH Publishing House, Calcutta, Bombay, New Delhi.
- Singleton, R. (1963): Elementary Genetics, D. Van Nostrand Co., Ltd., Inc., N.Y. & Affiliated East West Press (P) Ltd., New Delhi.
- Strickberger, M.W. (1976): Genetics (2nd Edition) MacMillan Publishing Co., Inc., N.Y., London
- Watson, J.D. (1977): Molecular Biology of the Gene, W.A. Benjamin, Inc., Menlo Park- California, Reading-Massachusetts, London, Amsterdam, Don Mills, Ontario, Sydney.
- Gardner,E.J & Snusted, D.P.(1984): Principles of Genetics (7thedition) John Wiley & Sons, N.Y. Chichester, Brisbane, Toronto, Singapore.
- Lewin, B. (1985) Genes VII Wiley Eastern Ltd., New Delhi, Bombay, Calcutta, Madras, Hyderabad.
- Allard R.W(1999): The Principles of Plant Breeding, John & Wiley and Sons.
- Poelman J.M: Breeding Field Crops, Springer.
- George Acquaah (2012): Principles of Plant Genetics & Breeding: Wiley-Blackwell.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL PAPER – V PRACTICAL SYLLABUS
CELL BIOLOGY, GENETICS AND PLANT BREEDING

Total hours of laboratory Exercises 45 hrs @ 2hrs/week Total credits:02

PAPER – V PRACTICAL SYLLABUS

Suggested Laboratory Exercises:

1. Study of the structure of cell organelles through photomicrographs.
2. Study of structure of plant cell through temporary mounts.
3. Study of various stages of mitosis using cytological preparation of Onion root tips.
4. Study of effect of organic solvent on permeability of cell membrane.
5. Numerical problems solving Mendel' Laws of inheritance
6. Chromosome mapping using 3-point test cross data.
7. Hybridization techniques – emasculation, bagging (for demonstration only).
8. Field visit to a plant breeding research station.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-V
(CELL BIOLOGY, GENETICS AND PLANT BREEDING)
Botany Practical Model Paper-V (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

Perform the Experiment **A. Perform** squash on onion root tip, prepare the slide, identify at least one division stage. Write the procedure and draw the diagram of reported stage.

	1 x 15 =	**15Marks**
Describe the procedure of Hybridization technique **B**	1 x 10 =	**10Marks**
Solving numerical problems on Mendelian in heritance **C, D**	2 x 7.5 =	**15Marks**
Record & Viva	=	**10Marks**
		---
		50 Marks

A-Onion root squash technique

B- Emasculation & Bagging

C&D Numerical problems on Mendelian Inheritance.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at V Semester End
Botany Paper V: CELL BIOLOGY GENETICS AND PLANT BREEDING
(Course: BO5207 Model Paper w.e.f. 2021-22)

Time: 2 1/2 Hrs. **Max. Marks: 60**

SECTION – A 3×10 =30M

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART – I

1. a) Describe the Ultra structure and functions of cell membrane
   OR
   b) Explain the Organization of DNA in chromosome
2. a) Explain the Watson & Crick model of DNA (OR) Explain about secondary structure of DNA
   OR
   b) Explain Replication of DNA especially Semiconservative model
3. a) Chromosome mapping (OR) 3 Point test cross
   OR
   b) Linkage concept and significance

PART – II

4. a) Methods of crop improvement
   OR
   b) Introduction and objectives of plant breeding
5. a) Role of Soma clonal variations
   OR
   b) Role of Mutations in crop improvement

SECTION – B 4×5=20M

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary.

1. Difference between Prokaryotic and Eukaryotic cell
2. Euchromatin, Heterochromatin
3. m-RNA Structure and Functions
4. Test Cross
5. Crossing Over theories
6. Selection in Plant breeding
7. Significance of Mutations in Plant breeding
8. Selection in Plant breeding

SECTION – C 5×2=10M

Answer any **FIVE** of the following Questions

1. Chromatids
2. Plasmodesmata
3. DNA polymerase
4. Purines
5. Auto polyploidy
6. Emasculation
7. NBPGR
8. RAPD

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
UNIT –I: CELL BIOLOGY	**1**	**2**	**2**	**20**
UNIT-II: GENETIC MATERIAL	**1**	**2**	**2**	**20**
UNIT-III: MENDELIAN INHERITANCE	**1**	**2**	**2**	**20**
UNIT-IV: PLANT BREEDING	**1**	**2**	**2**	**20**
UNIT-V : BREEDING, CROP IMPROVEMENT AND BIOTECHNOLOGY	**1**	**2**	**2**	**20**
Total marks allotted to all question including choice				**100**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-V / V Semester End (W.E.F. 2021-22)
CELL BIOLOGY, GENETICS AND PLANT BREEDING
III B.Sc., -Botany-5 / V Semester Question Bank

UNIT – I: CELL BIOLOGY

Essay Questions-

1. Describe theultra structure and functions of cell wall?
2. Explain the organization of DNA in chromosome
3. Describe ultra structure and functions of cell membrane

Short Answer Questions

1. Cell theory
2. Difference between Prokaryotic and Eukaryotic cell
3. Fluid mosaic model of cell membrane
4. Euchromatin & Heterochromatin

Very Short Notes.

1. Plasmodesmata
2. Protoplast
3. Middle lamella
4. Active transport
5. Centromere
6. Telomere
7. Chromatids
8. Karyotype
9. Idiogram
10. Nucleosome
11. Babianirings

UNIT – II: GENETIC MATERIAL

Essay Questions-

1. Watson & Crick model of DNA (OR) Explain about secondary structure of DNA
2. Replication of DNA especially Semiconservative model

Short Answer Questions

1. m-RNA Structure and Functions
2. t-RNA structure and Functions

Very Short Notes.

1. Piramadines
2. Purins
3. Bacteriophage
4. Nucleoside
5. Nucleotide
6. DNA polymerase
7. DNA grades
8. Replicon
9. m- RNA
10. r-RNA

UNIT – III: MENDELIAN INHERITANCE

Essay Questions-

1. Expain the Chromosome mapping (OR) 3 Point test cross
2. Write about Linkage concept and significance

Short Answer Questions

1. Back cross
2. Test cross
3. Crossing Over theories

Very Short Notes.

1. Back cross
2. Test cross
3. Linkage
4. Crossing over
5. Nullisomic
6. Trisomic
7. Chaisma
8. Auto polyploidy
9. Euploidy
10. Tetraploidy

UNIT – IV: PLANT BREEDING

Essay Questions-

1. Write about methods of crop improvement
2. Write an essay on Introduction and objectives of plant breeding

Short Answer Questions

1. Objectives of Plant breeding
2. Selection in Plant breeding

Very Short Notes.

1. NBPGR
2. Pureline selection
3. Clones
4. Emasculation
5. Bagging
6. Pedigree
7. RAPD
8. RFLP
9. MAS
10. Mutagened

UNIT – V: BREEDING, CROP IMPROVEMENT AND BIOTECHNOLOGY

Essay Questions-

1. Write an essay on Role of Mutations in crop improvement
2. Expain the Role of Somaclonal variations
3. Write an eassay on Molecular Breeding

Short Answer Questions

1. RFLP/Restriction Fragment Length Polymorphism
2. RAPD/ Rapid Amplified Polymorphic DNA
3. Hybridization of plant breeding
4. Significance of Mutations in Plant breeding

Very Short Notes.

1. RFLP
2. RAPD
3. Role of Mutations in Plant Breeding
4. Any Two advantages of Soma Clonal Variations

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VI / V Semester End (W.E.F. 2021-22)
ADVANCED ELECTIVE
PLANT ECOLOGY & PHYTOGEOGRAPHY (COURSE: BO5208)

Total hours of Teaching 40hrs @ 3 hrs/week Total Credits:03

UNIT – I: Elements of Ecology (12h)

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

UNIT– II: Ecosystem Ecology (12h)

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of Ecosystem-Primary, Secondary and Net productivity.
3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

UNIT – III: Population & Community Ecology (12h)

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, competition.
3. Interaction between plants growing in a community.

UNIT – IV: Phytogeography (12h)

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes

UNIT- V: Plant Biodiversity and its importance (12h)

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (*In-situ* and *ex-situ* methods).
4. Seed banks - conservation of genetic resources and their importance

Suggested activity: Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man's activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey.

Books for Reference:

- Daubenmire, R.F. (): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York
- Puri. G.S. (1960): Indian Forest Ecology (Vol.I & II) Oxford Book Co., New Delhi & Calcutta.
- Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.
- Misra, R. (1968): The Ecology work Book Oxford & INH Publishing Co., Calcutta
- Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders & Co., Philadelphia & Natraj Publishers, Dehradun.
- Odum E.P. (1975): Ecology by Holt, Rinert & Winston.
- Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.
- Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.
- Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi
- Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford & IBH Publishing Co Ltd. New Delhi.
- Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K.
- Chapman, J.L&M.J. Reiss (1992): ecology (Principles & Applications). Cambridge University Press, U.K.
- Cain, S.A. (1944): Foundations of Plant Geography Harper & Brothers, N.Y.
- Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Hague
- Good, R. (1997): The Geography of flowering Plants (2nd Edn.) Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL
PAPER – VI PRACTICAL SYLLABUS
PLANT ECOLOGY & PHYTOGEOGRAPHY

Total hours of laboratory Exercises 45 hrs @ 2hrs/week Total credits:02

1. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, rain gauze, and lux meter.
2. Permeability (percolation; total capacity as well as rate of movement) of different soil samples.
3. Determination of soil pH
4. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (4 each)
5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method
6. Study of Phytoplankton and macrophytes from water bodies.
7. To study field vegetation with respect to stratification, canopy cover and composition.
8. Study of plants included in agro forestry and social forestry.
9. To locate the hotspots, phyto geographical regions and distribution of endemic plants in the map of India.
10. The following practical should be conducted in the Field/lab with the help of photo-graphs, herbarium, Floras, Red data book- Study of endangered plants species, critically endangered plants species, vulnerable plant species and monotypic endemic genera of India.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-V
(PLANT ECOLOGY & PHYTOGEOGRAPHY)
Botany Practical Model Paper-VI (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

1.	Study Project under supervision	=	**15 Marks**
2.	Record & Viva-Voce	=	**10 Marks**
3.	Experiment **A**	=	**10 Marks**
4.	Anatomical adaptations of **B** (Section cutting)	=	**10 Marks**
5.	Spotters **C&D** (2x2 1/2)	=	**05 Marks**
		---	---
	Total	**=**	**50 Marks**
		---	---

1. Study Project of a surrounding Ecosystem (terrestrial or aquatic) (plant diversity, animal diversity, human activity, pollution levels, restoration efforts under supervision.
2. Presentation of the project work in Q & A session.
3. **A** -determination of soil porosity/PH/percolation/retaining capacity.
4. **B**- Xerophyte/Hydrophyte anatomical adaptations.
5. **C & D**-anemometer/rain gauze/lux meter.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at V Semester End
Botany Paper VI: PLANT ECOLOGY & PHYTOGEOGRAPHY
(Course: BO5208 Model Paper w.e.f. 2021-22)

Time: 2 1/2 Hrs. **Max. Marks: 60**

SECTION – A **3×10 =30 M**

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Explain about climate factors i.e. Light, Temperature
   OR
   b) Explain about interaction between plants and animals
2. a) Explain the Nitrogen Cycle
   OR
   b) Write an essay on Production Ecology
3. a) Explain about Community Ecology
   OR
   b) Explain about Population Ecology

PART - II

4. a) Write about Phytogeographic regions of India
   OR
   b) Write an essay on Endemism
5. a) Explain about Biodiversity hotspots in India
   OR
   b) Explain about loss of biodiversity

SECTION – B **4×5=20 M**

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Symbiosis
2. Food chain
3. Ecological pyramids
4. Ecotypes
5. Competition
6. Principles of phytogeography
7. Seed Banks
8. Conservation methods in biodiversity

SECTION – C **5×2=10 M**

Answer any **FIVE** of the following Questions

1. Ecotone
2. Pedology
3. Decomposers
4. Biogeo- chemicals cycling
5. Biological spectrum
6. Population
7. Paleoendemism
8. IUCN

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
UNIT –I: ELEMENTS OF ECOLOGY	**1**	**2**	**2**	**20**
UNIT-II: ECOSYSTEM ECOLOGY	**1**	**2**	**2**	**20**
UNIT-III: POPULATION & COMMUNITY ECOLOGY	**1**	**2**	**2**	**20**
UNIT-IV: PHYTOGEOGRAPHY	**1**	**2**	**2**	**20**
UNIT-V : PLANT BIODIVERSITY AND ITS IMPORTANE	**1**	**2**	**2**	**20**
Total marks allotted to all question including choice				**100**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc.-Botany-VI / V Semester End (W.E.F. 2021-22)
PLANT ECOLOGY& PHYTOGEOGRAPHY
III B.Sc.-Botany-VI / V Semester Question Bank

UNIT – I: Elements of Ecology

Essay Questions

1. Describe the role of light as an ecological factor.
2. Explain about interaction between plants and animals
3. Define the term soil. Discuss briefly the different components of soil.

Short Questions

1. Effect of temperature on vegetation
2. Symbiosis
3. Allelopathic Effect

Very Short Notes.

1. Ecology
2. Biome
3. Ecotone
4. Biosphere
5. Pedalogy
6. Humus
7. Halophytes
8. Myrmecophily
9. Epiphytes
10. Mutualism

UNIT– II: Ecosystem Ecology

Essay Questions

1. What is an Ecosysytem? Describe the different components of an Ecosysytem?
2. Define Primary productivity. Discuss different factors which influence the primary productivity of an ecosysytem
3. Exploain about Nitrogen Cycle.

Short Question

1. Food chain
2. Ecological pyramids
3. Phosphorous cycle

Very Short Notes.

1. Ecosystem
2. Decomposers
3. Abiotic
4. Nitrogen fixation
5. Ammonification
6. Denitrification
7. Consumers

UNIT – III: Population &Community Ecology

Essay Questions

1. Define Population. Discuss briefly the various characteristics that shown by population
2. Describe different characteristics shown by plant communities.

Short Questions

1. Ecotypes
2. Competition
3. Frequency

Very Short Notes.

1. Population
2. Natality
3. Mortality
4. Density
5. Frequency
6. Emigration
7. Therophytes
8. Biological spectrum
9. Edge effect

UNIT – IV: Phytogeography

Essay Questions

1. Describe the different Phytogeographic regions of India
2. What is Endemism. Write in detail about Endemism.

Short Questions

1. Discontinuous species
2. Principles of phytogeography

Very Short Notes.

1. Endemic
2. Wides
3. Endemic keystone species
4. Endangered species
5. Holoendemism
6. Paleoendemis

UNIT- V: Plant Biodiversity and its importance

Essay Questions

1. Explain about levels of biodiversity
2. Explain about Biodiversity hotspots in India
3. Write an essay on loss of biodiversity

Short Questions

1. Seed Banks
2. Conservation methods in biodiversity

Very Short Notes.

1. 1.Biodiversity
2. 2.UNCBD

3. 3.Genetic Diversity
4. 4.Species Diversity
5. 5.Hotspots
6. 6.UNEP
7. 7.WWF
8. 8.NBPGR
9. 9.Seed bank & Gene bank

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VII/ VI Semester End (W.E.F. 2021-22)
ADVANCED ELECTIVE
PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS
(Course: BO6209)

Total hours of Teaching 40hrs @ 3 hrs/week Total Credits:03

UNIT I: PLANT TISSUE CULTURE – 1 (12h)

1. History of plant tissue culture research - basic principles of plant tissue callus culture, meristem culture, organ culture, Totipotency of cells, differentiation and dedifferentiation.
2. Methodology - sterilization (physical and chemical methods), culture media, Murashige and Skoog's (MS medium), phytohormones, medium for micro-propagation/clonal propagation of ornamental and horticulturally important plants.
3. Callus subculture maintenance, growth measurements, morphogenesis in callus culture –organogenesis, somatic embryogenesis.

UNIT II: PLANT TISSUE CULTURE -2 (12h)

1. Endosperm culture – Embryo culture -culture requirements – applications, embryo rescue technique.
2. Production of secondary metabolites.
3. Cryopreservation; Germplasm conservation.

UNIT III: RECOMBINANT DNA TECHNOLOGY (12h)

1. Restriction Endonucleases (history, types I-IV, biological role and application); concepts of restriction mapping.
2. Cloning Vectors: Prokaryotic (PUC 18, PBR322, Ti plasmid and Lambda phage, Eukaryotic Vectors (YAC and briefly PAC)
3. Gene cloning (Bacterial Transformation and selection of recombinant clones, PCR mediated gene cloning)
4. Construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by complementation technique, colony hybridization.

UNIT IV: METHODS OF GENE TRANSFER (12h)

1. Methods of gene transfer- Agrobacterium-mediated, direct gene transfer by Electroporation, Microinjection, Micro projectile bombardment.
2. Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

UNIT V: APPLICATIONS OF BIOTECHNOLOGY (12h)

1. Applications of Plant Genetic Engineering – crop improvement, herbicide resistance, insect resistance, virus resistance.
2. Genetic modification – transgenic plants for pest resistant (Bt-cotton); herbicide resistance (Round Up Ready soybean); improved agronomic traits - flavrSavr tomato, Golden rice; Improved horticultural varieties Moon dust carnations

Books for Reference:

1. Pullaiah. T. and M.V.Subba Rao. 2009. Plant Tissue culture. Scientific Publishers, New Delhi.
2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
3. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.
4. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. Vikas Publication House Pvt. Ltd., New Delhi. 5th edition.
5. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K. 5th edition.
6. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

Suggested Activities: In vitro initiation of callus on artificial medium, seminars on utilization of rDNA technology, debates on applications of Biotechnology (whether it is a boon or bane to the society) studying growth patterns, vegetative characteristics of Bt cotton and identifying the features of its pest resistance

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL PAPER – VII PRACTICAL SYLLABUS
PLANT TISSUE CULTURE & PLANT BIOTECHNOLOGY

Total hours of laboratory Exercises 45 hrs @ 2hrs/week Total credits:02

PAPER – VII PRACTICAL SYLLABUS

1. Preparation of MS medium.
2. Demonstration of in vitro sterilization methods and inoculation methods using leaf and nodal explants of Tobacco/ Datura/ Brassica etc.
3. Study of embryo and culture, micro propagation of Banana, somatic embryogenesis, artificial seeds through photographs.
4. Construction of restriction map of circular and linear DNA from the data provided.
5. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfers by electroporation, microinjection, and micro projectile bombardment.
6. Different steps involved in genetic engineering for production of Bt. cotton, Golden rice, FlavrSavr tomato through photographs.
7. Isolation of plasmid DNA.
8. Restriction digestion and gel electrophoresis of plasmid DNA (optional)
9. Field visit to a lab involved in tissue culture
10. Study project under supervision of lecturer – tissue culture/ genetic engineering

Expected domain skills to be achieved: Ability to prepare artificial nutrient media, preparing independently, applying various sterilization procedures for media, glassware and biological materials, in vitro propagation of Banana callus, morphogenesis--s, clonal propagation methods, isolation of plasmid DNA individually and as a group.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-VI
(PLANT TISSUE CULTURE & PLANT BIOTECHNOLOGY)
Botany Practical Model Paper-VII (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

PRACTICAL MODEL PAPER

Q1. Project report (A) - 15 marks

Viva-voce on study project - 05 marks

Q2. Identify and write notes on B, C and D (3x4) - 12 marks

B- Tool/instrument/container used in sterilization

C- Tool/instrument/container used in gene transfer

D- GM crops (Photographs)

Q3. Construct restriction map of circular and/ or linear DNA from the data provided – - 08 marks

Q4. Field report - 05 marks

Q5. Record - 05 marks

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50 marks

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at VI Semester End
Botany Paper VII: Plant Tissue Culture and its Biotechnological Applications
(Course: BO6209 Model Paper w.e.f. 2021-22)

Time: 2 1/2 Hrs. **Max. Marks: 60**

SECTION – A **3×10 =30 M**

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Explain about Somatic hybridization
   OR
   b) Write about Sterilization methods of plant tissue culture?
2. a) Write about Endosperm culture requirements, applications
   OR
   b) Write about Production of Secondary metabolites
3. a) Explain about Gene Cloning
   OR
   b) Write about restriction mapping

PART - II

4. a) Write about Methods of Gene transfer in rDNA technology
   OR
   b) Explain about Selection of Transgenic Plants
5. a) Write about Transgenic Plants
   OR
   b) Write about Applications of Genetic Engineering

SECTION – B **4×5=20 M**

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Differentiation, Dedifferentiation
2. Cryopreservation
3. Restriction Endonucleases
4. GFP
5. Golden Rice
6. GUS
7. PCR mediated gene cloning
8. Bt-cotton

SECTION – C **5×2=10 M**

Answer **any five** Questions

1. Totipotency
2. Pyrethrin

3. What is PCR and what is it function?
4. Biolistic transformation
5. Interferon
6. Fusogens
7. Cryopreservation
8. molecular farming

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
UNIT –I: PLANT TISSUE CULTURE- 1	**1**	**1**	**1**	**17**
UNIT-II: PLANT TISSUE CULTURE -2	**1**	**1**	**1**	**17**
UNIT-III: RECOMBINANT DNA TEHNOLOGY	**1**	**1**	**1**	**17**
UNIT-IV: METHODS OF GENE TRANSFER	**1**	**1**	**1**	**17**
UNIT-V : APPLICATIONS OF BIOTECHNOLOGY	**1**	**1**	**1**	**17**
Total marks allotted to all question including choice				**85**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VII / VI Semester End (W.E.F. 2021-22)
ADVANCED ELECTIVE
PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS
III B.Sc., -Botany-VII/ VI Semester Question Bank

UNIT I: PLANT TISSUE CULTURE – 1

Essay Questions

1. Write about Sterilization methods of plant tissue culture?
2. Explain about Somatic hybridization

Short Questions

1. Meristem Culture
2. Differentiation, Dedifferentiation
3. Organ culture

Very Short notes.

1. Totipotency
2. Callus culture
3. Dedifferentiation
4. M.S. Medium
5. Micro-propagation
6. Explant
7. Inoculation
8. Somatic embryogenesis
9. Fusogens
10. Organogenesis

UNIT II: PLANT TISSUE CULTURE -2

Essay Questions

1. Write about Production of Secondary metabolites
2. Write about Endosperm culture requirements, applications

Short Questions

1. Cryopreservation
2. Embryo rescue technique
3. Embryo Culture

Very Short notes.

1. Embryogenesis
2. Haploid plants
3. Atropine
4. Pyrethrin
5. Reserpine
6. Cryopreservation
7. Germplasm

UNIT III: RECOMBINANT DNA TECHNOLOGY

Essay Questions

1. Explain about Cloning Vectors in rDNA technology

2. Write about restriction mapping
3. Write about cDNA libraries in rDNA technology

Short Questions
1. Restriction Endonucleases
2. PCR mediated gene cloning
3. Bacterial transformation

Very Short notes.
1. What is Molecular Scissor. Who discovered it?
2. Flush ended fragment
3. What is a plasmid and name artificial plasmids?
4. Chimeric DNA
5. What is Probe and mention its function?
6. YAC
7. Gene cloning
8. What is PCR and what is it function?
9. CDNA
10. Palindrome

UNIT IV: METHODS OF GENE TRANSFER

Essay Questions
1. Write about Methods of Gene transfer in rDNA technology
2. Explain about Selection of Transgenic Plants

Short Questions
1. Microinjection
2. Electroporation
3. GUS
4. GFP

Very Short notes.
1. Transgenic Plants
2. Name of the plasmid and vector which are widely used for obtaining transgenic plants?
3. What is molecular farming?
4. Electroporation
5. Micro injection
6. Biolistics
7. Selectable marker
8. Cohesive ends

UNIT V: APPLICATIONS OF BIOTECHNOLOGY

Essay Questions
1. Write about Applications of Genetic Engineering
2. Write about Transgenic Plants

Short Questions
1. Bt-Cotton
2. Golden Rice
3. Round Up Ready Soya bean

Very Short notes.

1. Glyphosate
2. Cry proteins
3. P.D.R.
4. Coat protein gene
5. BT Cotton
6. Flavrsavr tomato
7. Golden rice
8. Genome
9. G.M.P.
10. Interferon

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII- A-1/ VI Semester End (W.E.F. 2021-22)
CLUSTER ELECTIVE
ECONOMIC BOTANY (COURSE: BO6250)

Total hours of Teaching 40hrs @ 3 hrs/week Total Credits:03

UNIT – I

Introduction

1. Introduction to economic botany
2. Origin of agriculture
3. The nature of variation in plants – consequences of sexual recombination, inbreeding and asexual reproduction

UNIT – II

Cultivation and Applications of Cereal and Millets

1. Sorghum
2. Pear millet
3. Finger millet
4. Fox tail millet

UNIT – III

Cultivation and Applications of pulses

1. **Rice**
2. Wheat
3. Maize
4. Oats

UNIT – IV

Vegetable Oils, Spices and Fiber Yielding Plants – Cultivation and Applications

1. Sunflower oil
2. Sesame oil
3. Casrdomum
4. Black pepper

UNIT – V

Timber Yielding Plants and Ornamental Plants

1. Teak wood
2. Rose wood
3. Red sandal
4. Arjuna wood
5. Brief account on ornamental plants

Suggested Readings:

- Berly Brintnall Simpson and Molly Conner- Ogorzaly – Economic Botany

  Plants in our world, McGrahill International Editions

- Economic Botany 3rd Edition by Dr.V.Singh,Dr.P.C.Pande.Dr.D.K.Jain
- Economic Botany – A comprehensive study by S.L.Kochhar- Fifth Edition
- ATextbook Of Modern Economic Botany by A.V.S.S.Sambamurthy and N.S.Subrahmanyan.

Suggested activities: Study of flora and its diversity in the college campus or local area, enumerating wild and exotic species (*Parthenium*, Water hyacinth etc.)

Project work on any one of the Industries oil yielding and fiber yielding plants study and Processing Methods Study.

Field Visit to Observe Cultivation of Grains and Fruit Crops.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL
PAPER – VIII-A1 PRACTICAL SYLLABUS
ECONOMIC BOTANY (COURSE: BO6250

Total hours of laboratory Exercises 45 hrs @ 2hrs/week Total credits:02

1.Taxonamic status of food Plants, Industrial Plants, Drug yielding Plants and its uses

2. Propagation methods of fruit Plants: Citrus Fruits, Banana, Pineapple, Papaya

3.Agricultural and industrial uses of Plants

4.Classification of Ornamental Plants

5.Practical knowledge of operations from sowing to harvesting of Kharif crops

6.Judging the maturity and estimation of yield in oil crops.

Domain skills expected to achieve: Identification of exotic plant species, identification of forest trees based on the characteristics of bark, flowers and fruits, understanding the preservation methods of fresh and dry fruits, understanding the methods of safe disposal of biodegradable and non-biodegradable wastes

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-VI
ECONOMIC BOTANY COURSE: BO6250
Botany Practical Model Paper-VIII-A-1 (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

SCHEME OF PRACTICAL EXAMINATION

1. Assign the plants **A, B and C** to their respective families, giving reasons, family name and classification-2 marks, important diagrams- 3 marks. 3X5 = **15 marks**

2. Give the propagation methods of **D** **10 marks**

3. Comment on specimens **E, F and G (3x3 =)** **09 marks**

4. Report on Field visit **06 marks**
   To study sources of Kharif crops (10 plants),
   Oil yielding crops (10 plants)

5. Viva-Voce **05 marks**

6. Practical Record **05 marks**

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50 Marks

KEY

A. Taxonomic status of Food Plants,
B. Taxonomic status of Industrial Plants,
C. Taxonomic status of Drug yielding Plants
D. Propagation method- Citrus Fruits /Banana/ Pineapple/ Papaya
E. Agricultural used plant
F. Wood yielding plant
G. Fruit yielding plant

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-1 / VI Semester End (W.E.F. 2021-22)
CLUSTER ELECTIVE
ECONOMIC BOTANY (COURSE: BO6250)

Time: $2_{1/2}$ Hrs. **Max. Marks: 60**

SECTION – A **3×10 =30 M**

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Inbreeding and Asexual Reproduction.
   OR
   b) Consequences of Sexual Reproduction.
2. a) Cultivation and Applications of Banana.
   OR
   b) Cultivation and Applications of Papaya.
3. a) Cultivation and Applications of Rice.
   OR
   b) Cultivation and Applications of Wheat.

PART - II

4. a) Cultivation and Applications of Jute.
   OR
   b) Cultivation and Application of Sunflower oil.
5. a) Brief account on ornamental plants.
   OR
   b) Write Essay on Wood Anatomy.

SECTION – B **4×5=20 M**

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Definition of Economic Botany and its importance?
2. Propagation methods of Banana.
3. Advanced Oats Varieties.
4. Commercial importance of Jute.
5. Monoculture.
6. Propagation Methods in Pine apple.
7. Soil requirement & Land preparation in Barley
8. Advanced Oats Varieties

SECTION – C **5×2=10 M**

Answer <u>any five</u> of **the following Questions**

1. Inbreeding definition.
2. Citrus canker.
3. Crop Rotation
4. Essential crop rotation for cotton crop.
5. Propagation of Arjun wood
6. Botany of Sesame plant
7. Agronomy of sun flower
8. Arboriculture.

<u>BLUE PRINT FOR QUESTION SETTER</u>

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
Unit – I: Economic Botany Introduction	**1**	**1**	**1**	**17**
Unit - II: Fruit Crops – Cultivation And Applications	**1**	**1**	**1**	**17**
Unit - III: Grains – Cultivation And Applications	**1**	**1**	**1**	**17**
Unit - IV: Vegetable Oils, Fiber Yielding Plants – Cultivation And Applications	**1**	**1**	**1**	**17**
Unit - V : Timber Yielding Plants And Ornamental Plants	**1**	**1**	**1**	**17**
Total marks allotted to all question including choice				**85**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-1 / VI Semester End (W.E.F. 2021-22)
CLUSTER ELECTIVE
ECONOMIC BOTANY (COURSE: BO6250)
III B.Sc., -Botany-VIII-A-1/ VI Semester Question Bank

UNIT-1: ECONOMIC BOTANY INTRODUCTION

Essay Questions.

1. Origin of Agriculture.
2. Inbreeding and Asexual Reproduction.
3. Consequences of Sexual Reproduction.

Short notes.

1. Definition of Economic Botany and its importance?
2. Sexual recombination
3. Asexual reproduction
4. Geographic variations in Plants
5. Polyploidy
6. Vavilov's Centers

Very Short Notes.

1. Agriculture
2. Inbreeding definition.

UNIT-2: FRUIT CROPS – CULTIVATION AND APPLICATIONS

Essay Questions.

1. Cultivation and Applications of Citrus.
2. Cultivation and Applications of Banana.
3. Cultivation and Applications of Papaya.

Short notes.

1. Propagation methods of Banana.
2. Sex differentiation in Papaya.
3. Propagation Methods in Pine apple.

Very Short Notes.

1. Propping in Banana
2. Desakering in Banana
3. Citrus canker.

UNIT-3: GRAINS – CULTIVATION AND APPLICATIONS

Essay Questions.

1. Cultivation and Applications of Rice.
2. Cultivation and Applications of Wheat.

Short notes.

1. Soil requirement & Land preparation in Barley.
2. Seed treatment & Sexuing & Planting Methods in Rice
3. Advanced Oats Varieties.

4. Cultivation Methods in Rice forming.

Very Short Notes.
1. Roughing
2. Crop Rotation
3. Intercropping system.

Unit-4: Vegetable Oils, Fiber Yielding Plants – Cultivation And Applications

Essay Questions.
1. Cultivation and Application of Sunflower oil.
2. Cultivation and Applications of Jute.

Short notes.
1. Castor oil uses and Benefits.
2. Manuring and Irrigation in Sesame oil cultivation.
3. Suitable soil and Climate for Sunflower oil plantation.
4. Commercial importance of Jute.

Very Short Notes.
1. Essential crop rotation for cotton crop.
2. Botany of Jute plant.
3. Harvesting of Caster
4. Botany of Sesame plant.
5. Agronomy of sun flower production.

UNIT-5: TIMBER YIELDING PLANTS AND ORNAMENTAL PLANTS

Essay Questions.
1. Brief account on ornamental plants
2. Write Essay on Wood Anatomy.

Short notes.
1. Importance of Red sandal.
2. Importance of Ornamental plants.
3. Monoculture.
4. Wood anatomy.

Very Short Notes.
1. Arboriculture.
2. Botany of Rosewood.
3. Propagation of Arjun wood.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -BotanyVIII-A-2 / VI Semester End (W.E.F. 2021-22)
CLUSTER ELECTIVE
ETHNOBOTANY AND MEDICINAL BOTANY(COURSE:BO6251)

Total hours of Teaching 40hrs @ 3 hrs/week Total Credits:03

UNIT –I: ETHNOBOTANY (12h)

1. Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethno botany in the present context
2. Major and minor ethnic groups or Tribals of India, and their life styles.
3. Plants used by the tribal populations:
   a) Food plants,
   b) intoxicants and beverages,
   c) Resins and oils and miscellaneous uses.

UNIT -II: ROLE OF ETHNOBOTANY IN MODERN MEDICINE: (12h)

1) Role of ethnobotany in modern medicine with special example *Rauvolfia sepentina, Trichopus zeylanicus, Withania somnifera.*
2) Medico-ethnobotanical sources in India
3) Significance of the following plants in ethno botanical practices (along with their habitat and morphology)
   a) *Azadirachta indica*, b) Ocimum *sanctum*, c) *Vitex negundo*,
   d) *Gloriosa superba*, e) *Phyllanthus niruri*,
   f) *Indigofera tinctoria*, g) *Senna auriculata* *h*) *Curcuma longa*.
4) Role of ethnic groups in the conservation of plant genetic resources.

UNIT-III: Ethnobotany As a Tool to Protect Interests of Ethnic Groups (12h)

1. Sharing of wealth concept with few examples from India.
2. Biopiracy, Intellectual Property Rights and Traditional Knowledge.

UNIT -IV: History, Scope and Importance of Medicinal Plants.
Indigenous Medicinal Sciences (12h)

1. Definition and Scope-**Ayurveda**: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments.
2. **Siddha**: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.
3. **Unani**: History, concept: Umoor-e- tabiya, tumors treatments/ therapy, polyherbal formulations (in brief).

UNIT -V: Conservation of endangered and endemic medicinal plants: (12h)

1. Definition: endemic and endangered medicinal plants,
2. Red list criteria
3. *In situ* conservation: Biosphere reserves, sacred groves, National Parks
4. *Ex situ* conservation: Botanical Gardens.

Suggested Readings:

- S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
- Glimpses of Indian. Ethnobotany, Oxford and I B H, New Delhi – 1981.
- S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
- S.K. Jain, 1990. Contributions of Indian ethnobotany. Scientific publishers, Jodhpur.
- Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester
- Rama Ro, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India. Howrah.
- Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
- Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India.
- Pal, D.C. & Jain, S.K., 1998. Tribal Medicine. Naya Prakash Publishers, Calcutta
- Raychudhuri, S.P., 1991. (Ed.) Recent advances in Medicinal aromatic and spice crops. Vol.1, Today& Tomorrow's printers and publishers, New Delhi

Suggested Activities: Studying plant utilization methods by tribal/rural/migrant populations for their beverages, food, medicinal and uses, seminars on role of ethnic groups in conservation of plant genetic resources, project work on traditional knowledge about plant medicines, study of indigenous medicinal sciences and their efficacy.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL PAPER – VIII-A-2 PRACTICAL SYLLABUS
ETHNOBOTANY AND MEDICINAL BOTANY

Total hours of laboratory Exercises 45 hrs @ 2hrs/week Total credits:02

PAPER – VIII PRACTICAL SYLLABUS

1. Ethnobotanical specimens as prescribed in theory syllabus
2. Detailed morphological and anatomical study of medicinally important part(s) of locally available plants (Minimum 8 plants) used in traditional medicine.
3. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore.

Domain skills expected to achieve: Identification of various plant parts used as medicines by ethnic groups, understanding the difference between ancient wisdom and modern system of medicine, traditional medicine at the rescue of curing drug resistant maladies like malaria and viral diseases, understanding the role of spices in Indian kitchens, their therapeutic role

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-VI
(ETHNOBOTANY AND MEDICINAL BOTANY)
Botany Practical Model Paper-VIII-A-2 (w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

1. Identify the specimen A- Give reasons (morphological and anatomical) and draw labeled sketches **- 15 marks**
2. Identify and write about the medicinal uses of B-and C- (2x5=) **- 10 marks**
3. Comment on D and E. (2x 4=) **- 08 marks**
4. Report on Field visit: **- 07 marks**

   List to be prepared mentioning special features of plants used by tribal populations as Medicinal Plants & Spices. Write their botanical and common names, parts used and diseases/disorders for which they are prescribed.
5. Viva-voce **- 05 marks**
6. Record **- 05 marks**

Total - 50 marks

KEY

A. Plants given in unit II (i)

B. Plants used in Ayurvedic preparations (Amla in Chyavanprash, Senna in Laxatives)

C. Do –

D. Photographs of National parks, Biosphere reserves and Botanical gardens.

E. Photograph of famous personalities in Ayurveda/Siddha medicine.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at VI Semester End
Botany Paper VIII-A-2: ETHNOBOTANY AND MEDICINAL BOTANY
(Course: BO6251 Model Paper w.e.f. 2021-22)

Time: 2 1/2 Hrs. **Max. Marks: 60**

SECTION – A 3×10 =30 M

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Give a brief account on Major and Minor Ethnic groups of India

OR

b) Define Ethnobotany? Write an Essay on History, Concept and Scope of Ethnobotany.

2. a) Give a brief account on role of Ethnic groups in the Conservation of plant genetic Resources.

OR

b) Write an essay on Trichopus Zeylanicus morphology, ethnobotany and its role in modern medicine

3. a) Define Bio piracy? Write an Essay on bio piracy in India.

OR

b) Write an essay on Intellectual property rights.

PART - II

4. a) Give a brief account on Siddha Medicinal System.

OR

b) Write an Essay on Unani System of Medicine.

5. a) Define *In-Situ* conservation? Give detailed account on Biosphere reserves.

OR

b) Define *Ex-situ* conservation. Write an essay on Botanical gardens.

SECTION – B 4×5=20 M

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Plants used by tribals for edible purpose.
2. Systematic position of Gloriosa superba
3. Differences between IPR and Sui-generis System.
4. Triphala rasayana preparation
5. Endemic species.
6. Cassia auriculata
7. In-situ Conservation

SECTION – C 5×2=10 M

Answer **any five** of the following Questions

1. Ethno toxicology
2. Monk's pepper
3. Bio piracy

4. Sodhana therapy
5. ICRISAT
6. Boerhaavia diffusa
7. Tridosha principle
8. Endangered species

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
Unit –I: Ethnobotany	**1**	**1**	**1**	**17**
Unit-II: Role Of Ethnobotany In Modern Mediine.	**1**	**1**	**1**	**17**
Unit-III: Ethnobotany As A Tool To Protect Intrest of Ethnic groups	**1**	**1**	**1**	**17**
Unit-IV: History, Scope And Importance Of Medicinal plants indigenous Medicinal Science	**1**	**1**	**1**	**17**
Unit-V : Conservation Of Endangered And Endemic Medicinal plants	**1**	**1**	**1**	**17**
Total marks allotted to all question including choice				**85**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-2/ VI Semester End (W.E.F. 2021-22)
ETHNOBOTANY AND MEDICINAL BOTANY
III B.Sc., -Botany-VIII-A-2/ VI Semester Question Bank

UNIT-1: ETHNOBOTANY.

Essay Questions.

1. Define Ethnobotany? Write an essay on History, Concept and Scope of Ethnobotany.
2. Give a brief account on Major and Minor Ethnic groups of India.

Short notes.

1. Tribal Music and Music instruments.
2. Beverages
3. Plants used by tribals for edible purpose.

Very Short Notes.

1. Ethnobotany
2. Janaki Ammal
3. Ethnogynocology
4. Ethno toxicology
5. Dravidians
6. Boerhaavia diffusa

UNIT-2: ROLE OF ETHNOBOTANY IN MODERN MEDICINE.

Essay Questions.

1. Write an essay on Trichopus Zeylanicus Morphology, Ethnobotany and its role in Modern medicine
2. Give a brief account on role of Ethnic groups in the Conservation of plant genetic Resources.

Short Notes.

1. Curcuma longa.
2. Phyllanthus niruri Morphology and ethnobotany.
3. Ocimum sanctum ethnobotany
4. Cassia auriculata

Very Short Notes.

1. Serpentine
2. Arogyapacha
3. Artemisia
4. Cassia tora
5. Systematic position of Gloriosa superba
6. Curcumin
7. Monk's pepper
8. Ethnobotany on Phyllanthus

UNIT-III: ETHNOBOTANY AS A TOOL TO PROTECT INTEREST OF ETHNIC GROUPS

Essay Questions.

1. Write an Essay on Intellectual property rights.
2. Give a brief account on Traditional Knowledge.
3. Define Bio piracy? Write an Essay on bio piracy in India.

Short notes.

1. Differences between IPR and Sui-generis System.
2. Equity considerations in Traditional Knowledge.
3. Write Short notes on plants used as Agricultural implements.

Very Short Notes.

1. Tambura
2. Tannin
3. Dyes
4. Madhuka indica
5. Biopiracy
6. IPR

UNIT-IV: HISTORY, SCOPE AND IMPORTANCE OF MEDICINAL PLANTS INDIGENOUS MEDICINAL SCIENCES.

Essay Questions.

1. Define of Ayurveda? Explain pancha maha bhutas, Saptadhatu and Tridosha concept.
2. Give a brief account on Siddha Medicinal System.
3. Write an Essay on Unani System of Medicine.

Short notes.

1. Triphala rasayana Preparation
2. Poly herbal formulations.
3. Plants used in Siddha Medicine.

Very Short Notes.

1. Ayurveda
2. Shalyatantra
3. Brahmi
4. Tridosha principle
5. Sodhana therapy
6. Siddha
7. Rasayana
8. Sarangdhar Samhita
9. Araku

UNIT-V: CONSERVATION OF ENDANGERED AND ENDEMIC MEDICINAL PLANTS

Essay Questions.

1. Define *In-Situ* conservation? Give detailed account on Biosphere reservoirs
2. Define *Ex-situ* conservation. Write an Essay on Botanical gardens.

Short notes.

1. Endemic species.
2. *In-situ* Conservation.

3. Red Data book.
4. Biosphere reserves

Very Short Notes

1. Nandadevi
2. Kaziranga national park
3. ICARDA
4. ICRISAT
5. Scared grooves
6. Endangered species
7. IUCN
8. FRI

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-3 / VI Semester End (W.E.F. 2021-22)
CLUSTER ELECTIVE
PHARMACOGNOSY AND PHYTOCHEMISTRY (COURSE: BO 6913)

Total hours of Teaching 40hrs @ 3 hrs/week Total Credits:03

UNIT-I: Pharmacognosy (12h)

Definition, Importance, Classification of drugs - Chemical and Pharmacological, Drug evaluation methods

UNIT–II: Organoleptic and microscopic studies: (12h)

Organoleptic and microscopic studies with reference to the nature of active principles and common adulterants of *Alstonia scholaris* (bark), *Adhatoda vasica* (leaf), *Strychnos nuxvomica* (seed), R*auwolfia serpentine* (root) and *Zinziber officinalis* C*atharanthus roseus.*

UNIT-III: Secondary Metabolites: (12h)

1. Definition of primary and secondary metabolites and their differences, major types - terpenes, terpenoids.
2. A brief idea about extraction of alkaloids.Origin of secondary metabolites – mevalonate pathway, shikimate pathway.

UNIT-IV: Phytochemistry: (12h)

1. Biosynthesis and sources of drugs:
   a) Phenols and phenolic glycosides: structural types, biosynthesis, importance of simple phenolic compounds, tannins, anthraquinones, coumarins and furanocoumarins, flavones and related flavonoid glycosides, anthocyanins, betacyanins, lignins and lignans).
   b) Steroids, sterols, saponins, withanolides, ecdysones, cucurbitacins: Biosynthesis, commercial importance.
   c) Alkaloids: Different groups, biosynthesis, bioactivity.
   d) Volatile oils, aromatherapy.

UNIT-V: Enzymes, proteins and amino acids as drugs: **(12h)**

1. Vaccines, toxins and toxoids, antitoxins, immune globulins, antiserums,
2. Vitamins, Antibiotics – chemical nature, mode of action.
3. Pharmacological action of plant drugs – tumor inhibitors, PAF antagonists, antioxidants, phytoestrogens and others.
4. Role of different enzyme inhibitors.

BOOKS FOR REFERENCE:

- Wallis, T. E. 1946. Text book of Pharmacognosy, J & A Churchill Ltd.
- Roseline, A. 2011. Pharmacognosy. MJP Publishers, Chennai.
- Gurdeep Chatwal, 1980. Organic chemistry of natural products. Vol.I. Himalaya Publishing house.
- Kalsi, P. S. and Jagtap, S., 2012. Pharmaceutical medicinal and natural product chemistry N.K. Mehra, Narosa Publishing House Pvt. Ltd. New Delhi.
- Agarwal, O. P. 2002. Organic chemistry–Chemistry of organic natural products. Vol. II. Goel publishing house, Meerut.
- Harborne, J. B. 1998. Phytochemical methods –a guide to modern techniques of plant analysis 3rd edition, Chapman and Hall
- Datta & Mukerji, 1952. Pharmacognosy of Indian roots of Rhizome drugs. Bulletin No.1 Ministry of Health, Govt. of India.

Suggested Activities: Isolation techniques of active principles from various parts of popular medicinal plants, debates on the efficacy of plant medicines and palliative cure, volatile oils from plants-extraction methods, project work on crude drugs

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PROJECT WORKS
PHARMACOGNOSY AND PHYTOCHEMISTRY

Total hours of Botany Projects 45 hrs @ 2hrs/week Total credits:02

1. Morphological Study and adaptable characters in Mangroves.
2. Pollen grains study in few locally available plants.
3. Biofuel production process and Cultivation.
4. Current Methods used for Farming of Cereals, Rice by using Bio fertilizers, Bio pesticides.
5. Plant Sps used for Cultivation and life Existence by Ethnic groups in East Godavari.
6. Collection of C3 Plants.
7. Production of Various Plantlets through Plant Tissue Culture.
8. Chromosome analysis in different plants.
9. Identification of C4 Plants.
10. Identification Angiosperms through different Keys.
11. Observation of Dicot and Monocot Stomata.
12. Preparation of Protein Rich foods from Plants.
13. Preparation Edible of Vitamin Rich Tonics from Plant Products.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

III B.Sc., BOTANY PROJECT WORK
(w.e.f 2021-22)

Time: 2 hours **Max. Marks: 50**

Total Study and Collection of Thesis	-	10M
Work done	-	20M
Submission of Work	-	10M
Viva	-	10M

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at VI Semester End
Botany Paper VIII-A-3: PHARMACOGNOCY AND PHYTOCHEMISTRY
(Course: BO6913 Model Paper w.e.f. 2021-22)

Time: 2 1/2 Hrs. **Max. Marks: 60**

SECTION – A **3×10 =30 M**

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Define pharmacognocy. and write essay on classification of Drugs.

OR

b) Give a detailed note on Drug evaluation methods.

2. a) Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Rauwolfia serpentina.

OR

b) Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Zingiber officinal.

3. a) What are terpenoids? Explain various types of Terpenoids.

OR

b) What are alkaloids? Write essay on Alkaloids.

PART - II

4. a) What are the different types of Phenols? Describe their biosynthesis.

OR

b) Explain different groups of Alkaloids, biological source, active principles and their Pharmacological action.

5. a) What are Antibiotics? Classify them.

OR

b) What are vaccines? Explain various types of Vaccines.

SECTION – B **4×5=20 M**

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Importance of Pharmacognocy.
2. Chemical constituents of Ginger.
3. Phenols.
4. Importance of Sterols.
5. Phytoestrogens
6. Sterols
7. Enzyme inhibitors
8. Tumor inhibitors

SECTION – C **5×2=10 M**

Answer **any five** Questions

1. Refractive index of Physical evaluation.

2. Pharmacological importance of Alstonia Bark.
3. Definition and molecular formula of Diterpenoids
4. Write about Tanins.
5. Define Enzyme inhibitors.
6. Which plants are used to curing Anti malarial and Anti cancer
7. Comman adulterants of Zinziber
8. What is Vaccine? Write present using major vaccines

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
UNIT –I: UNIT-1: PHARMACOGNOSY	**1**	**1**	**1**	**17**
UNIT-II : ORGANOLEPTIC AND MICROSCOPIC STUDY	**1**	**1**	**1**	**17**
UNIT-III: SECONDARY METABOLITES	**1**	**1**	**1**	**17**
UNIT-IV: PHYTOCHEMISTRY	**1**	**1**	**1**	**17**
UNIT-V : ENZYMES, PROTEINS AND AMINO ACIDS AS DRUGS	**1**	**1**	**1**	**17**
Total marks allotted to all question including choice				**85**

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-3/ VI Semester End (W.E.F. 2021-22)
PHARMACOGNOSY AND PHYTOCHEMISTRY
III B.Sc., -Botany-VIII-A-3/ VI Semester Question Bank

UNIT-1: PHARMACOGNOSY

Essay Questions

1. Define pharmacognocy.and write essay on classification of Drugs.
2. Give a detailed note on Drug evaluation methods.

Short notes.

1. Chemical evaluation of crude drugs.
2. Biological evaluation.
3. Importance of Pharmacognocy.

Very Short Notes.

1. Define pharmacognocy
2. Crude drug definition
3. Classification types
4. Give examples of plant names chemically evaluated resins.
5. Give examples of plant names chemically evaluated volatile oils.
6. Give examples of plant names chemically evaluated glycosides.
7. Pharmacological drugs acting on Respiratory system
8. Central nervous system therapeutic drug examples
9. Which plants are used to curing Anti malarial and Anti cancer .
10. Methods of evaluation crude drugs.
11. Refractive index of Physical evaluation
12. Define Quantitative Microscopy
13. Which tests are used to identify individually of Glycosides ,Flavanoids

UNIT-2: ORGANOLEPTIC AND MICROSCOPIC STUDIES.

Essay Questions

1. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Alstonia Scholaris bark.
2. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Rauwolfia serpentina.
3. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Zingiber officinal.

Short notes.

1. Microscopic studies of Alstonia scholaris bark
2. Chemical constituents of Ginger.
3. Active principle of Nux-vomica seeds.

Very Short Notes.

1. Define Oraganoleptic and Microscopic studies
2. Active principles of Alstonia scholaris Bark
3. Pharmacological importance of Alstonia Bark
4. Pharmacological importance of Adhatoda vasica
5. Organoleptic studies on Strychnos nux-vomica

6. Biological classification of Rauwolfia serpentine
7. Active principles of Rauwolfia serpentine
8. Pharmacological importance of Zinziber rhizome
9. Active principles of Catharanthus
10. Comman adulterants of Zinziber

UNIT-3: SECONDARY METABOLITES

Essay Questions

1. What are terpenoids? Explain various types of Terpenoids.
2. What are alkaloids? Write essay on Alkaloids.

Short notes.

1. Shikimate pathway.
2. Mevalonate Pathway.
3. Acetate Pathway.
4. Phenols.
5. Sterols.

Very Short Notes.

1. Definition of Secondary metabolites
2. Major types of sencondary metabolites
3. Define Terpenoids
4. Classification types of Terpenoids
5. Definition and molecular formula of diterpenoids
6. Give detailed examples of Monoterpenoids
7. Write about protoalkaloids
8. Define steroids
9. Types of alkaloids
10. What is Morphium and who given this name

UNIT-4: PHYTOCHEMISTRY.

Essay Questions

1. What are the different types of Phenols? Describe their biosynthesis.
2. Explain different groups of Alkaloids, biological source, active principles and their Pharmacological action.

Short notes

1. Anthocyanin's and Betacyanins.
2. Anthraquinones.
3. Coumarins
4. Importance of Sterols.
5. Aromatherapy.
6. Olatile oils.

Very Short Notes.

1. Definition of Phenol
2. Structure and examples of Trihydric Phenols
3. Write about Tanins
4. Classification types of Tanins
5. Structures of Hydrolysable Tanins

6. Cyanogenetic and Cyanophoric Glycosides
7. Major types of Flavonoids
8. Define aldehydes
9. Pharmaceutical application of Volatile oils
10. Define Cardiac Glycosides
11. Write about Aromatheraphy

UNIT-5: ENZYMES, PROTEINS AND AMINOACIDS AS DRUGS.

Essay Questions

1. What are vaccines? Explain various types of Vaccines.
2. Write an essay on Classes, sub classes, types and sub types of Human immunoglobulins.
3. What are Antibiotics? Classify them.

Short notes.

1. Phytoestrogens
2. Antiserum
3. Tumor inhibitors.
4. Anti-oxidants.
5. Enzyme inhibitors
6. Toxoids.

Very Short Notes.

1. What is Vaccine? Write present using major vaccines.
2. Classification of Vitamins
3. Define Enzyme inhibitors
4. What is Toxins and Toxoids
5. What was the uses of Immune globulins?
6. Definition of Anti-oxidants and give examples
7. Present widely using Human immune globulins
8. What are major Antibiotics
9. Uses of Antibiotics and give Examples
10. Define Phytoestrogens

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
CERTIFICATE COURSE FOR BOTANY
TITLE: AYURVEDIC MEDICINE
2021-2022
B.Sc, BZC, MBC, HBC For I,II III Years

Total Hours :30Hours **Credits :2**

Department of Botany will be going to conduct 45 days certificate course on or before 28/02/2022 . certificate issued after completion of the course (assessment necessary for certificate)

Purpose of the course or course out comes ; Self employement ,
To encourage the small scale industry, To Earn additional income

1) **Qualifications** : Degree
2) **Course** : MUSHROOM CULTIVATION
3) **Medium** : English
4) **Course duration** : 45 hrs. from 01/02/2022 to 28/02/2022
5) **Instructional hrs. (teaching)** : 1hr per day
6) **Instructional hrs timings** : 4pm to 5pm
7) **Mode of instructins** : off line and online
8) **Final assessment** : offline or online exam, exam date announced later
9) **Instructors** : Dr.Ch.John Samuel, Mrs.Sara Palaparthy **&** Dr M.Krishna Rao.
10) **Fee** : exam fee Rs 200/-

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF BOTANY
CERTIFICATE COURSE
MUSHROOM CULTIVATION
Total hours of instructions and practicals-45
syllabus

UNIT –I (9 hrs)
Introduction- history- scope of edible mushroom cultivation
Types of mushrooms available in India
Poisonous mushrooms.

UNIT-2 (9 hrs)
Spawn preparation- sterilization, multiplication

UNIT-3 (9 hrs)
Cultivation- locally available vessels, -compost preparation inoculation, culture rack –water sprayer, tray, -mushroom bed preparation –factors –harvesting.

UNIT-4 (9 hrs)
Storage-short term storage (Refrigeration – up to 24 hrs) – long term storage (canning, pickels, papads), drying, storage in salt solutions

HANDS ON TRAINING & PRACTICALS (9 hrs)

Field visit (with your own expenses) **1 day**

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF BOTANY
CERTIFICATE COURSE
MUSHROOM CULTIVATION
Total hours of teaching and practicals-45

Question paper – **40 marks**
(2 questions from each section, answer any one)
(Each section carries 10 marks)
Project work - **20 marks**

Assignments **10 Marks**

Practical - **30 marks**

Total 100 marks

Enrolment in NPTEL Courses 2021-2022 for Botany Faculty & Students

Course Name	SME Name	Institute	Course Duration	Timeline
Functional Genomics	Prof. S.Ganesh	IIT Kanpur	04 weeks	Jan
Plant Developmental Biology	Prof. Shri Ram Yadav	IIT Roorkee	04 weeks	Dec

Enrolment of students and Faculty into upcoming NPTEL courses.

P R GOVERMENT COLLEGE (AUTONOMOUS), KAKINADA

The **Board of Studies in B.Sc BOTANY** for the academic year 2021-2022 held in November 2021 in Dept. of Botany & Horticulture.

AGENDA:

The board of studies of a department in the college shall

1. Adapting APSCHE syllabus for all Semesters
2. Adapting 50- External evaluation and 50- Internal evaluation for Ist Semester 60- External evaluation and 40- Internal evaluation for II, III, IV, V & VIth Semesters for the Academic year 2021-22.
3. Conduct of Semester End Practical examinations for I, II, & III Years
4. Approval of compulsory projects for III Year Cluster paper
5. Approval of conversion of teaching method for some practical oriented topics through audio & video visuals
6. Approval of student online courses including faculty for the year 2021-22.
7. Approval of 1st year I & II semesters syllabus with theory & practicals will be finalized by following APSCHE guidelines in coming one or two months.
8. Approval of NPTEL courses to all B.Sc Botany students
9. Approval of Hands on training programs on mushroom cultivation to B.Sc Botany final year students.

The members of B.O.S in Botany discussed all the issues kept in agenda at length and taken following resolutions.

RESOLUTIONS:

1. The Chairperson submitted the syllabus for Botany which was adopted from the Adikavi Nannaya University from the Academic year 2021-22.
2. Resolved Ist Year I & II Semesters syllabus with theory & Practical will be finalized by following APSCHE guidelines in coming one or two months.
3. Resolved to include Botany Projects instead of A-3 Practicals.
4. Resolved to adopt 60 External, 40 Internal evaluations for all 3 Years students , 50 External and 50 Internal for 2021-2022 admitted batch.
5. Resolved to conduct practical for all semesters.
6. Resolved to introduce Certificate Course to all Students with 2 Credits.
7. Resolved to conduct offline exam for Certificate course and certificates will be provided to their respective mails.
8. Resolved to introduce moocs courses in NPTEL Platform useful for their future career and higher studies as well.

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Faculty members:

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2. **Dr.M.KRISHNA RAO**
   Regular Faculty in Botany
3. **P.RAJESH**
   Guest Faculty in Botany