BOARD OF STUDIES IN B.Sc BOTANY
2019-2020

DEPARTMENT OF BOTANY, MICROBIOLOGY AND HORTICULTURE

SYLLABUS FOR B.Sc BOTANY

PITHAPUR RAJAHS 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, Microbiology and Horticulture

The Board of Studies meeting for **Botany** subject during the academic year 2019-2020 is conducted at the Dept. of Botany, Microbiology & Horticulture on **April 2019** with Smt. P.SARA, Lecturer in-Charge in the chair along with the following members.

Name, Designation and Address **Signature**

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1. **Chair Person:**
   Smt P.SARA
   Lecturer in-Charge
   Dept. of Botany & Microbiology
   PRGC(A),
   Kakinada

2. **AdiKavi Nannaya University Nominee:**
   Dr. A.SRINIVASA RAO,
   Lecturer in charge of Botany,
   Govt. Degree college, Mandapeta.
   Mobile: 8309843949
   E-Mail: drannabattulasrao@gmail.com

3. **Members Nominated by Executive Council of the College:**
   a. **Member from Research Organization:**
      Smt P.SWATHI
      Assistant Director,
      Biological Control Laboratory
      Dept. of Agriculture
      Kakinada
      Mobile: 9848350962
      E-Mail: swathi3002@yahoo.com

   b. **Subject Expert 1:**
      Smt. P.A.S.S.KRISHNA KUMARI
      Lecturer in Botany
      ASD Women's College
      Kakinada, EG Dist.
      Mobile: 9121830415
      Email: pullelakk21@gmail.com

   c. **Subject Expert 2:**
      Smt. NIRMALA RANI
      Lecturer in Botany
      Ideal College
      Kakinada
      Mobile: 9490893569
      E-Mail: nirmalarani.kusuma@yahoo.com

Name, Designation and Address **Signature**

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d. Subject Expert 2:

Smt. NIRMALA RANI
Lecturer in Botany
Ideal College
Kakinada
Mobile: 9490893569
E-Mail: nirmalarani.kusuma@yahoo.com

e. 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. **T. KALPANA**
   Lecturer in Botany (Regular)

2. **B. RAJA RAJESWARI**
   Contract Faculty in Botany

3. **V. ANITHA**
   Guest Faculty in Botany

4. **G. SRAVANI**
   Guest Faculty in Botany

b. Student members:

1.

2.

3.

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

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

BOTANY COURSE STRUCTURE AND SYLLABUS

YEAR	SEMESTER	PAPER	PAPER TITLE	MARKS	CREDITS
I YEAR	I	I	MICROBIAL DIVERSITY, ALGAE & FUNGI	60+40	3
		I	PRACTICAL	50	2
	II	II	DIVERSITY OF ARCHEGONIATE AND PLANT ANATOMY	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	PLANT DIVERSITY AND HUMAN WELFARE	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, MICROBIOLOGY & HORTICULTURE

Botany Model Blue Print for the Question paper and choice for I, II & III Years (w.e.f. 2019-20 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)	10	5	50	6	5	30
Total Questions & Total Marks =		**15**	**-**	**100**	**9**	**-**	**60**

$$\textbf{Percentage of choice given} = \frac{100 - 60}{100} \times 100 = \frac{40}{100} \times 100 = 40\%$$

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., -Botany-I/ I Semester End (W.E.F. 2019-20)
MICROBIAL DIVERSITY, ALGAE AND FUNGI (COURSE: BO1207)
Total hours of Teaching 60hrs @ 4 hrs per week Total Credits:03

UNIT-I: MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity (12h)

1. Discovery of microorganisms, origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.
2. Classification of microorganisms – R.H. Whittaker's five kingdom concept.
3. Brief account of special groups of bacteria- Archaebacteria, Mycoplasma, Chlamydia, Actinomycetes and Cyanobacteria.

UNIT-II: VIRUSES (12h)

1. Viruses- Discovery, general account, structure& replication of –T4 Phage (Lytic, Lysogenic) and TMV, Viroid's.
2. Plant diseases caused by viruses – Symptoms, transmission and control measures (Brief account only).
3. Study of Tobacco Mosaic, Bhendi Vein clearing and Papaya leaf curl diseases.

UNIT-III: BACTERIA (12h)

1. Bacteria: Discovery, General characteristics, cell structure and nutrition
2. Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
3. Economic importance of Bacteria.

UNIT-IV: Algae (12h)

1. General account - thallus organization and reproduction in Algae.
2. Fritsch classification of Algae (up to classes only) and economic importance.
3. Structure, reproduction and life history of *Oedogonium, Ectocarpus* and Polysiphonia.

UNIT-V: FUNGI (12h)

1. General characteristics and outline classification (Ainsworth).
2. Structure, reproduction and life history of *Rhizopus* (Zygomycota), *Pencillium* (Ascomycota), and *Puccinia* (Basidiomycota).
3. Lichens-Structure and reproduction; ecological and economic importance.

Books for Reference:

- Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley – Blackwell.
- Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
- Presscott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw – Hill Co. New Delhi.
- Fritsch F.E. (1935 The Structure & Reproduction of Algae 1945): Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.
- Smith, G.M (1955): Cryptogamic Botany (Vol.I Algae, Fungi & Lichens) Mc Graw-Hill Book Co., New York.
- Ian Morris (1967): An Introduction to the Algae, Hutchinson, London.
- Alexopoulos, C.J.., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley & Sons, Inc., N.Y., Chicester, Brisbane, Toronto, Singapore.
- Webster, J (1999): Introduction to Fungi (2nd edition) Cambridge University Press.

******Student Activities like Seminars, Assignments, Fieldwork, Study Projects, Models etc. are Part of Curriculum for all units in all papers.

Suggested activity: Seminar, Quiz, debate, collection of diseased plant parts – studying symptoms and identification of pathogen, collection and study of **fresh** and marine Algae available in local area.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
BOTANY PRACTICAL SYLLABUS
MICROBIAL DIVERSITY, ALGAE AND FUNGI

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

1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator.
2. Preparation of liquid and solid media for culturing of microbes (Demonstration).
3. Study of viruses and bacteria using electron photo micrographs (TMV, Bacteriophage, HIV, Cocci, Bacillus, Spirillum bacteria).
4. Gram staining technique.
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Bhendi vein clearing and Leaf curl of Papaya), Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast).
6. Study of vegetative and reproductive structures of the following:
   - Cyanobacteria: *Nostoc and Scytonema.*
   - Algae: *Oedogonium, Ectocarpus, Polysiphonia*,
   - Fungi: *Rhizopus, Penicillium and Puccinia.*
7. Study of plant material infected by Fungi (Rot of tomatoes, blue and greenmoulds of Ciitrus fruits and wheat rust (Section cutting of diseased parts of Wheat and Barberry identification of different spores).
8. Lichens: Morphology and of anatomy of different thalli.
9. Field Visit.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., Botany Practical Examinations at the End of Semester-I
(MICROBIAL DIVERSITY, ALGAE AND FUNGI)
Botany Practical Model Paper-I (w.e.f 2019-20)

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

1. Identify giving reasons two of the given Algal mixture" A". Leave your preparation for evaluation. Draw labeled diagrams. (Slide-1mark, Diagrams-1mark, Identification-1mark)

   (3x 20) = **06 Marks**

2. Make suitable stained preparation of the material "B" to bring out the details of internal structure--identify giving reasons. Draw labeled diagrams and leave your preparations for evaluation. (Slide-4 marks, diagrams-3 marks, Identification-3marks)

   10 Marks

3. Perform Gram staining of the given Bacterial culture **09 Marks**

4. Write critical notes and Identify D, E, F, G and H (5X3) = **15 Marks**

5. Record (submission is compulsory) **10 Marks**

Total = 50 Marks

Key:

A. Algae material

B. Fungi material

C. Bacterial culture

D. One of the instruments of Micro biology laboratory.

E. Whole specimen or a permanent slide of Algae.

F. Whole specimen or a permanent slide of Fungi.

G. Whole specimen or a permanent slide of Plant disease studied.

H. Whole specimen or a permanent slide of Lichens.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I Year B.Sc., Degree Examinations at I Semester End
Botany Paper I: MICROBIAL DIVERSITY, ALGAE AND FUNGI
(Course: BO1207 Model Paper w.e.f. 2019-20)

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

Section – A **3×10 =30M**

Write any three of the following questions, Draw neat and labeled diagrams wherever necessary

1. Write essay on origin of life
2. Explain the economic importance of bacteria
3. Dicuss about transmission of viruses
4. Write a detailed account on economic importance of Algae
5. Discribe the structure and reproduction of lichens

Section – B **6×5=30M**

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

6. Mycoplasma
7. T.M.V
8. Reproduction in ectocarpus
9. Economic importance of lichens
10. Asexual reproduction in Bacteria
11. Heterothallism
12. Bacterial cell structure
13. Cystocarp
14. Leaf curl disease of papaya
15. Cyanobacteria cell structure

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
Unit-I: Microbial World	2	1	20
Unit-II: Viruses	2	1	20
Unit-III: Bacteria	2	1	20
Unit-IV: Algae	2	1	20
Unit-V: Fungi	2	1	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-1/ I Semester End (W.E.F. 2019-20)
MICROBIAL DIVERSITY, ALGAE AND FUNGI
BOTANY PAPER -1 QUESTION BANK (SEMESTER-1)

UNIT –I: MICROBIAL WORLD (Origin and evolution of life, microbial diversity)

Essay questions

1. Write an essay on origin of life
2. Write an essay on R. H. Whittaker's five kingdom classification
3. Write an essay on Cyanobacteria

Short answer Questions

1. Germ theory of disease
2. Carl woese's domain system
3. Mycoplasma
4. Actionomycetes

UNIT -2: VIRUSES

Essay questions

1. Give an account on structure of viruses
2. Write an essay on multiplication of viruses
3. Write an essay on plant diseases caused by viruses and their control

Short answer Questions

1. Symmetry of viruses
2. TMV
3. Bacterio phage
4. Transmission of viruses
5. Leaf curl of papaya

UNIT – 3: BACTERIA

Essay questions

1. Write an essay on Nutrition in bacteria
2. Write an essay on Reproduction of bacteria
3. Write an essay on Economic importance of bacteria

Short answer Questions

1. General characters of Bacteria
2. Cell structure of Bacteria
3. Asexual reproduction n Bacteria

UNIT -4: ALGAE

Essay questions

1. Give an account on general characters of algae
2. Write an essay on thallus organization of algae
3. Describe the economic importance of algae

4. Fritch classification of algae
5. Describe the structure, reproduction and life cycles of Ectocarpus
6. Describe the structure, reproduction and life cycles of Polysiphonia

Short answer Questions

1. Pigmentation in algae
2. Reserve food material in algae
3. Life cycles in algae
4. Oedogonium life history in Macrandrous species
5. Carpo sporophyte

UNIT -5: FUNGI

Essay questions

1. Write an essay on general character of fungi
2. Write an essay on structure, reproduction and life history of rhizopus
3. Write an essay on structure, reproduction and life history of penicillium
4. Write an essay on structure, reproduction and life history of puccinia

Short answer Questions

1. Uredeniales stages
2. Telutospores
3. Picnidiospores
4. Ascus
5. Conidiophores
6. Peziza
7. Asexual reproduction n penicillum
8. Types of lichen

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., -Botany-II/ II Semester End (W.E.F. 2019-20)
DIVERSITY OF ARCHAEGONIATES & PLANT ANATOMY (COURSE: BO2207)
Total hours of Teaching 60hrs @ 4 hrs/week Total Credits:03

UNIT – I: BRYOPHYTES (12h)

1. General characters, Classification (up to classes)
2. Structure, reproduction and Life history of *Marchantia,* and *Funaria.*
3. Evolution of Sporophyte in Bryophytes.

UNIT - II: PTERIDOPHYTES (12h)

1. General characters, classification (up to Classes)
2. Structure, reproduction and life history of *Lycopodium,* and *Marsilea.*
3. Heterospory and seed habit.
4. Stelar evaluation in Pteridophytes.

UNIT – III: GYMNOSPERMS (12h)

1. General characters, classification (up to classes)
2. Morphology, anatomy**,** reproduction and life history of *Pinus and Gnetum*
3. Economic importance.

UNIT –IV: Tissues and Tissue systems (12h)

1. Meristems - Root and Shoot apical meristems and their histological organization.
2. Tissues – Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems–Epidermal, ground and vascular.

UNIT – V: Secondary growth (12h)

1. Anomalous secondary growth in *Achyranthes, Boerhaavia* and *Dracaena.*
2. Study of local timbers of economic Importance-Teak, Rosewood, Arjuna (Tellamaddi) Red sander.

Books for Reference:

- Smith, G.M. (1971): Cryptogamic Botany Vol. II. - Tata Mc Graw Hill
- Pandey & Trivedi, A Text Book of Botany Vol. II - Vikas Publishing House Pvt. Ltd.
- Parihar, N.S. (1970): Bryophyta, Central Book Depot, Allahabad.
- Vasistha P C, A K Sinha and Adarsh Kumar 2008- Botany for Degree students: Bryophyta S Chand & Co, New Delhi.
- Parichar N 1972 - Pteridophyta, Central Book Depot, Allahabad.
- Sporne, K.R. (1965): Morphology & Gymnosperms, Hutchinson University Library, London
- Esau, K. (1971): Anatomy of Seed Plants. John Wiley and Son, USA.
- Eames, A.J., & Mc Daniels, L.H. (1979): An Introduction to Plant anatomy Tata-McGraw-Hill Publishing Co., (P) Ltd. Bombay, New Delhi.
- Esau. K. (1980): Plant Anatomy, (2nd Edition) Wiley Eastern Ltd., New Delhi.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., BOTANY PRACTICAL PAPER – II PRACTICAL SYLLABUS
DIVERSITY OF ARCHAEGONIATES & PLANT ANATOMY

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

PAPER – II PRACTICAL SYLLABUS

1. Morphology (vegetative and reproductive structures), anatomy of the following: *Marchantia, Funaria, Lycopodium* and *Pinus.*
2. Anatomy:
    a. Demonstration of double staining technique.
    b. Tissue organization in root and shoot apices using permanent slides
    c. Preparation of double staining slides
    d. Anomalous secondary structure of *Achyranthes, Boerhavia* and *Dracaena.*
    e. Anatomical study of wood in T.S., T.L.S. and R.L.S.
3. Field visits to local timber depots.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., Botany Practical Examinations at the End of Semester-II
(DIVERSITY OF ARCHAEGONIATES & PLANT ANATOMY)
Botany Practical Model Paper-II (w.e.f 2019-20)

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

1. Section cutting of material -A **09 Marks**
   (Slide 3 marks, diagrams-3 marks, Identification-3 marks
2. Section cutting of material -B **09 Marks**
   (Slide 3 marks, diagrams-3 marks, Identification-3 marks)
3. Section cutting of material -C **10 Marks**
   (Slide 4 marks, diagrams-3 marks, Identification-3 marks)
4. Identification of spotters - D, E, and F 3x4 =**12 marks**
5. Record (submission compulsory) **10 marks**

Total = 50 Marks

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Key:

A. Bryophyta/ Pteridophyta material

B. Gymnosperm material.

C. Anatomy material.

D. Whole specimen or permanent slide of Bryophyta/ Pteridophyta

E. Whole specimen or permanent slide of Gymnosperm.

F. Whole specimen or permanent slide of wood.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I Year B.Sc., Degree Examinations at II Semester End
Botany Paper II: DIVERSITY OF ARCHEGONIATES AND PLANT ANATOMY
(Course: BO2207 Model Paper w.e.f. 2019-20)

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

Section – A **3×10 =30M**

Write any THREE of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Describe the structure, Reproduction and life history of Marchantia
2. Write essay on Stelar evolution in Pteridophytes
3. Write about General characters' and classification of Gymnosperms
4. Write an essay on simple tissues
5. Define anomalous secondary Growth

Section – B **6×5=30M**

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

1. Funaria Female branch
2. Classification of Bryophytes
3. Pinus needle
4. Gnetum ovule
5. Rose wood
6. Types of Stomata
7. Apical Cell theory
8. Types of Vascular bundles
9. Teak
10. Complex Tissues

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
Unit – I: Bryophytes	2	1	20
Unit - II: Pteridophytes	2	1	20
Unit – III: Gymnosperms	2	1	20
UNIT –IV: Tissues And Tissue Systems	2	1	20
UNIT – V: Secondary Growth	2	1	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. 2019-20)
DIVERSITY OF ARCHAEGONIATES & PLANT ANATOMY
I B.Sc., -Botany-2/ II Semester Question Bank

UNIT – I: BRYOPHYTES

Essay Questions.

1. Describe the Structure, Reproduction and Life history of Marchantia.
2. Describe the Reproduction and Life history of Funaria.
3. Evolution of Sporophyte in Bryophytes.

Short notes.

1. Marchantia Antheridiophore
2. Marchantia Archegoniophore.
3. Funaria female branch.
4. Classification of Bryophyta.

UNIT - II: PTERIDOPHYTES

Essay Questions.

1. Write general Characters of Pteridophytes.
2. Describe the Life history of Marsilea.
3. Write essay on Stelar evolution in Pteridophytes.

Short questions.

1. Lycopodium stem anatomy.
2. Marsilea Rhizome.
3. Marsilea Sporocarp
4. Marsilea petiole
5. Asexual reproduction in Lycopodium.

UNIT – III: GYMNOSPERMS

Essay Questions.

1. Write an essay on General characters and classification of Gymnosperms.
2. Write a detailed note on Pinus Life cycle.
3. Economic importance of gymnosperms.

Short notes.

1. Pinus needle
2. Pinus male cone.
3. pinus female cone
4. Pinus ovuliferous scale.
5. Gnetum male cone
6. Gnetum ovule.

UNIT –IV: Tissues and Tissue systems

Essay Questions

1. Write a detailed note on Simple tissues.
2. Write an essay on Complex tissues.
3. Write essay on Root and Shoot apical meristems.

Short notes.

1. Apical cell Theory
2. Histogen Theory
3. Tunica- Carpus Theory
4. Types of Stomata.
5. Latisiferous tissue.
6. Types of Vascular bundles
7. Trichome.

UNIT – V: Secondary growth

Essay Questions.

1. Define anomalous secondary growth? Explain the anomalous secondary growth in Stem of Achyranthus.
2. Define anomalous secondary growth? Explain the anomalous secondary growth in Stem of Boerhavia.
3. Define anomalous secondary growth? Explain the anomalous secondary growth in Stem of Dracaena.

Short Notes

1. Teak
2. Rosewood
3. Arjuna.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., -Botany-III/ III Semester End (W.E.F. 2019-20)
PLANT TAXONOMY AND EMBRYOLOGY (COURSE: BO3207)
Total hours of Teaching 60hrs @ 4 hrs/week Total Credits:03

UNIT – I: INTRODUCTION TO PLANT TAXONOMY (12h)

1. Fundamental components of taxonomy (identification, nomenclature, classification)
2. Taxonomic resources: Herbarium- functions& important herbaria, Botanical gardens.
3. Botanical Nomenclature - Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

UNIT – II: CLASSIFICATION (12h)

1. Types of classification- Artificial, Natural and Phylogenetic.
2. Bentham & Hooker's system of classification- merits and demerits.
3. Engler & Prantle's system of classification- merits and demerits
4. Phylogeny

UNIT –III: SYSTEMATIC TAXONOMY-I (12h)

Systematic study and economic importance of the following families: Annonaceae, Fabaceae, Rutaceae, Curcurbitaceae, and Apiaceae.

UNIT –IV: SYSTEMATIC TAXONOMY-II (12h)

Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Ephorbiaceae, orchidaceae and Poaceae.

UNIT – V: EMBRYOLOGY (12h)

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (*Peperomia, Drusa, Adoxa*) of embryo sacs.
3. Pollination and Fertilization (outlines) Endosperm development and types.
4. Development of Dicot and Monocot embryos, Polyembryony.

Books for Reference:

- Porter, C.L.: Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.
- Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.
- Jefferey, C. (1968): An Introduction to Plant Taxonomy J.A. Churchill, London.
- Mathur, R.C. (1970): Systematic Botany (Angiosperms) Agra Book Stores – Lucknow, Ajmer, Allahabad, Delhi.
- Maheswari, P (1963): Recent Advances in the Embryology of Angiosperms (Ed.,)
- International Society of Plant Morphologists – University of Delhi.
- Swamy. B.G.L. & Krishnamoorthy. K.V. (1980) : From flower to fruit Tata McGraw Hill Publishing Co., Ltd., New Delhi.
- Maheswari, P. (1985): An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co., Ltd., New Delhi.
- Bhojwani, S.S. & Bhatnagar, S.P. (2000): The Embryology of Angiosperms (4^{th} Edition) Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi.

Suggested activity: Collection of locally available plants of medicinal importance, observing pollen grains in honey, Aero palynology-collection of pollen from air using glycerin strips in different seasons.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., BOTANY PRACTICAL PAPER – III PRACTICAL SYLLABUS
PLANT TAXONOMY AND EMBRYOLOGY

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

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus.
2. Demonstration of herbarium techniques.
3. Structure of pollen grains using whole mounts (*Catharanthus*, *Hibiscus*, *Acacia*, Grass).
4. Demonstration of Pollen viability test using *in- vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides / Photographs.
6. Structure of endosperm (nuclear and cellular);
7. Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
8. Isolation and mounting of embryo (using *Symopsis / Senna* / *Crotalaria*)
9. Field visits.
10. Study of local flora and submission of Field Note Book.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., Botany Practical Examinations at the End of Semester-III
(PLANT TAXONOMY AND EMBRYOLOGY)
Botany Practical Model Paper-III (w.e.f 2019-20)

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

1. Describe the given Plant specimens (A & B) in technical terms. Draw neat labeled diagrams of twig with inflorescence, L.S. of Flower, T.s. of Ovary and floral Diagram. Give floral formula. Identify the family

   2x10 = **20 Marks**

   (Description-
   vegetative - 2 marks, floral – 4 marks;
   diagrams-3 marks, Identification-1 marks)

2. Derive the plant specimens C & D to their respective families- 2x04 = **08 Marks**

3. Identification of spotters - D, E, and F (Embryology) 3x04 = **12 Marks**

4. Record & Herbarium (submission compulsory) **10 Marks**

Total = 50 Marks

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II Year B.Sc., Degree Examinations at III Semester End
Botany Paper III: PLANT TAXONOMY & EMBRYOLOGY
(Course: BO3207 Model Paper w.e.f. 2019-20)

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

Section – A **3×10 =30M**

Write any THREE of the following questions, Draw neat and labeled diagrams wherever necessary

1. Write an essay on Herbarium
2. Explain about Bentom and Hookers classification, merits and demerits
3. Write a detailed account on Cucurbitaceae family
4. Write an essay on Asteraceae family
5. Write a detailed note on endosperm types

Section – B **6×5=30M**

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

1. Botanical Gardens
2. Binomial system
3. Natural classification
4. Apiaceae Floral charecters
5. Double fertilization
6. Sub Family in Asclepiadeace
7. Phylogenetic classification
8. Economic importance of poaceae
9. Poly embryony
10. Economic importance of Euphorbiaceae

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
UNIT – I: INTRODUCTION TO PLANT TAXONOMY	2	1	20
UNIT – II: CLASSIFICATION	2	1	20
UNIT –III: SYSTEMATIC TAXONOMY-I	2	1	20
UNIT –IV: SYSTEMATIC TAXONOMY-II	2	1	20
UNIT – V: EMBRYOLOGY	2	1	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
II B.Sc-Botany-III/ III Semester End (W.E.F. 2019-20)
PLANT TAXONOMY AND EMBRYOLOGY
II B.Sc-Botany-III/ III Semester Question Bank

UNIT – I: INTRODUCTION TO PLANT TAXONOMY

Essay Questions.

1. Write an Essay On Fundamental Concepts of taxonomy.
2. Give a Detailed account on Herbarium.
3. write an Essay on ICBN.

Short notes

1. Botanical Gardens
2. Binomial System.

UNIT – II: CLASSIFICATION

Essay Questions.

1. Give a Detailed account on Bentham -Hooker Classification and also write Merits and Demerits of this classification
2. Write an Essay on Engler -Prantl system of Classification and also Write Merits and Demerits of this Classification.

Short notes.

1. Artificial Classification.
2. Natural Classification.
3. Phylogenetic Classification.

UNIT –III: SYSTEMATIC TAXONOMY-I

Essay Questions.

1. Give a Detailed account on Rutaceae Family.
2. Write an Essay on Cucurbitaceae Family.
3. Give a detailed note on Apiaceae Family.

Short notes.

1. Floral characters of Annonaceae.
2. Economic importance of Poaceae.
3. Economic Importance of Annonaceae.

UNIT –IV: SYSTEMATIC TAXONOMY-II

Essay Questions.

1. Write an Essay on Composite Family.
2. Give a Detailed note on Lamiaceae Family.
3. Write an Essay on Euphorbiaceae Family.

Short notes.

1. Economic importance of Asteraceae.

2. Sub families in Asclepiadaceae
3. Economic importance of Aracaceae

UNIT – V: EMBRYOLOGY

Essay Questions.

1. Write an Essay on Microsporogenisis.
2. Give a Detailed note on Development of malegametophte.
3. Describe the types of tetrasporic embryo sacs.
4. Give a Detailed note on types of Endosperms.
5. Give a Detailed note on Development of Dicot embryo.
6. Give a Detailed note on Development of Monocot embryo.

Short notes.

1. Anther Structure.
2. Ovule types.
3. Monosporic Embryo sac.
4. Bisporic Embryo sac.
5. Polyembryony

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
II B.Sc., -Botany-IV/ IV Semester End (W.E.F. 2019-20)
PLANT PHYSIOLOGY AND METABOLISM (COURSE: BO4207)
Total hours of Teaching 60hrs @ 4 hrs/week Total Credits:03

UNIT – I: Plant – Water relations (12h)

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing mechanism of stomata.

UNIT –II: Mineral nutrition & Enzymes (12h)

1. Mineral Nutrition**:** Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Nitrogen metabolism - biological nitrogen fixation in *Rhizobium*, outlines of protein synthesis (transcription and translation).
3. Enzymes**:** General characteristics, mechanism of enzyme action and factors regulating enzyme action.

UNIT –III: PHOTOSYNTHESIS (12h)

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, carbon assimilation pathways: C_3, C_4, and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

UNIT – IV: PLANT METABOLISM (12h)

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.
2. Lipid Metabolism**:** Types of lipids, Beta-oxidation.

UNIT –V: GROWTH AND DEVELOPMENT (12h)

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering -photoperiodism, role of phytochrome in flowering; Vernalization.

Books for Reference:

- Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) Addison-Wesley Publishing Co., Inc. Reading, Massachusetts, Palo alto, London.
- Devlin, R.M. (1969): Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi
- Noggle, R.& Fritz (1989): Introductory Plant Physiology Prentice Hall of India
- Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.
- Mayer, Anderson & Bonning (1965): Introduction to Plant Physiology D. Van Nostrand. Publishing Co., N.Y.
- Mukherjee, S. A.K. Ghosh (1998) Plant Physiology, Tata McGraw Hill Publishers(P) Ltd., New Delhi.
- Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
- Plummer, D. (1989) Biochemistry–the Chemistry of life, McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.
- Day, P.M.& Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

Suggested activity: Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube.

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 transpiration by Ganongs' photometer
6. Demonstration of ascent of sap/Transpiration pull.
7. Effect of Temperature on membrane permeability by colorimetric method.
8. Study of mineral deficiency symptoms using plant material/photographs.
9. Separation of chloroplast pigments using paper chromatography technique.
10. Rate of photosynthesis under varying Co_2 concentrations.
11. 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 2019-20)

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. 2019-20)

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

Section – A 3×10 =30M

Write any THREE of the following questions, Draw neat and labeled diagrams wherever necessary

1. What is Transpiration. Describe the mechanism of opening and closing of Stomata
2. Explain about biological nitrogen fixation in Rhizobium
3. Write an essay on Photo phosphorylation
4. Write a detailed note on Glycolysis
5. Describe about Photoperiodism

Section – B 6×5=30M

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

1. Importance of water in plant metabolism
2. Apoplast and Symplast
3. Transcription
4. Nitrogen metabolism
5. Photosynthetic pigments
6. B – Oxidation
7. CAM
8. Role of Auxins in agriculture
9. Types of Lipids
10. Avena coleoptiles curvature text

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
UNIT – I: Plant – Water relations	2	1	20
UNIT –II: Mineral nutrition & Enzymes	2	1	20
UNIT –III: PHOTOSYNTHESIS	2	1	20
UNIT – IV: PLANT METABOLISM	2	1	20
UNIT –V: GROWTH AND DEVELOPMENT	2	1	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
II B.Sc., -Botany-IV/ IV Semester End (W.E.F. 2019-20)
PLANT PHYSIOLOGY AND METABOLISM
II B.Sc., -Botany-4/ IV Semester Question Bank

UNIT – I: PLANT – WATER RELATIONS

Essay Questions.

1. Write an Essay on Water potential and its Components.
2. What is meant by ascent of sap? Explain this biophysical process with Cohesion - Tention Theory.
3. What is Transpiration? Describe the mechanism of opening and closing of stomata.
4. 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.

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. Write Essay on General Characters of Enzymes.
4. Describe the Mechanism of Enzyme action.

Short notes.

1. Nitrogen Metabolism.
2. Transcription.
3. Translation.

UNIT –III: PHOTOSYNTHESIS

Essay Questions.

1. Write an Essay on Photophasporelatoin.
2. Describe the Mechanism of C3 Pathway.
3. Describe the mechanism of C4 Pathway.
4. Give a Detailed note on Mechanism of Phloem transport.

Short notes.

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

UNIT – IV: PLANT METABOLISM

Essay Questions

1. Write an Essay on Plant Metabolism.

2. Give a detailed note on Glycolysis.
3. Write an Essay on Electron transport system

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

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. Phototropic and geotropic Movements.
5. Avena coleoptile curvature test.
6. Effect of salt stress on plants.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-V / V Semester End (W.E.F. 2019-20)
CELL BIOLOGY, GENETICS AND PLANT BREEDING (COURSE: BO5207)
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.

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, coupling and repulsion
4. Crossing Over: concept & significance.

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 2019-20)

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. 2019-20)

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

Section – A **3×10 =30M**

Write any THREE of the following questions, Draw neat and labelled diagrams wherever necessary

1. Ultra structure and functions of cell membrane
2. Explain about secondary structure of DNA
3. Linkage concept and significance
4. Introduction and objectives of plant breeding
5. Role of Somaclonal variations

Section – B **6×5=30M**

Answer any SIX of the following Questions, Draw neat and labelled diagrams wherever necessary

1. Difference between Prokaryotic and Eukaryotic cell
2. m-RNA Structure and Functions
3. Crossing Over theories
4. Selection in Plant breeding
5. RAPD/ Rapid Amplified Polymorphic DNA
6. Significance of Mutations in Plant breeding
7. Objectives of Plant breeding
8. Test cross
9. t-RNA structure and Functions
10. Echromatin, Heterochromatin

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
UNIT – I: Cell Biology	2	1	20
UNIT – II: Genetic Material	2	1	20
UNIT – III: Mendelian Inheritance	2	1	20
UNIT – IV: Plant Breeding	2	1	20
UNIT – V: Breeding, Crop Improvement and Biotechnology	2	1	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
III B.Sc., -Botany-V / V Semester End (W.E.F. 2019-20)
CELL BIOLOGY, GENETICS AND PLANT BREEDING
III B.Sc., -Botany-5 / V Semester Question Bank

UNIT – I: CELL BIOLOGY

Essay Questions-

1. Ultra Structure and functions of cell wall?
2. Organization of DNA in chromosome
3. 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. Echromatin, Heterochromatin

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

UNIT – III: MENDELIAN INHERITANCE

Essay Questions-

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

Short Answer Questions

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

UNIT – IV: PLANT BREEDING

Essay Questions-

1. Methods of crop improvement
2. Introduction and objectives of plant breeding

Short Answer Questions

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

UNIT – V: BREEDING, CROP IMPROVEMENT AND BIOTECHNOLOGY

Essay Questions-

1. Role of Mutations in crop improvement
2. Role of Somaclonal variations
3. 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

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VI / V Semester End (W.E.F. 2019-20)
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 2019-20)

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. 2019-20)

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

Section – A **3×10 =30M**

Write any THREE of the following questions, Draw neat and labelled diagrams wherever necessary

1. Explain about climate factors i.e. Light, Temperature
2. Explain about Nitrogen Cycle
3. Explain about Population Ecology
4. Explain about Endemism
5. Explain about Biodiversity hotspots in India

Section – B **6×5=30M**

Answer any SIX of the following Questions, Draw neat and labelled diagrams wherever necessary

1. Symbiosis
2. Ecological pyramids
3. Ecotypes
4. Principles of phytogeography
5. Seed Banks
6. Conservation methods in biodiversity
7. Discontinuous species
8. Frequency
9. Food chain
10. Soil profile

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
UNIT – I: Elements of Ecology	2	1	20
UNIT– II: Ecosystem Ecology	2	1	20
UNIT – III: Population &Community Ecology	2	1	20
UNIT – IV: Phytogeography	2	1	20
UNIT- V: Plant Biodiversity and its importance	2	1	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
III B.Sc.-Botany-VI / V Semester End (W.E.F. 2019-20)
PLANT ECOLOGY& PHYTOGEOGRAPHY
III B.Sc.-Botany-VI / V Semester Question Bank

UNIT – I: Elements of Ecology

Essay Questions
1. Explain about climate factors i.e. Light, Temperature
2. Explain about interaction between plants and animals

Short Questions
1. Soil profile
2. Symbiosis

UNIT– II: Ecosystem Ecology

Essay Questions
1. Explain about Production Ecology
2. Exploain about Nitrogen Cycle

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

UNIT – III: Population &Community Ecology

Essay Questions
1. Explain about Community Ecology
2. Explain about Population Ecology

Short Questions
1. Ecotypes
2. Competition
3. Frequency

UNIT – IV: Phytogeography

Essay Questions
1. Write about Phytogeographic regions of India
2. Explain about Endemism

Short Questions
1. Discontinuous species
2. Principles of phytogeography

UNIT- V: Plant Biodiversity and its importance

Essay Questions

1. Explain about levels of biodiversity
2. Explain about Biodiversity hotspots in India
3. Explain about loss of biodiversity

Short Questions

1. Seed Banks
2. Conservation methods in biodiversity

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VII/ VI Semester End (W.E.F. 2019-20)
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 2019-20)

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. 2019-20)

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

Section – A **3×10 =30M**

Write any THREE of the following questions, Draw neat and labelled diagrams wherever necessary

1. Explain about Somatic hybridization
2. Write about Production of Secondary metabolites
3. Write about cDNA libraries in rDNA technology
4. Explain about Selection of Transgenic Plants
5. Write about Transgenic Plants

Section – B **6×5=30M**

Answer any SIX of the following Questions, Draw neat and labelled diagrams wherever necessary

1. Meristem Culture
2. Cryopreservation
3. Restriction Endonucleases
4. Microinjection
5. Bt-Cotton
6. Golden Rice
7. GUS
8. Bacterial transformation
9. Embryo rescue technique
10. Organ culture

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
UNIT-I: PLANT TISSUE CULTURE – 1	2	1	20
UNIT-II: PLANT TISSUE CULTURE -2	2	1	20
UNIT-III: RECOMBINANT DNA TECHNOLOGY	2	1	20
UNIT-IV: METHODS OF GENE TRANSFER	2	1	20
UNIT-V: APPLICATIONS OF BIOTECHNOLOGY	2	1	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
III B.Sc., -Botany-VII / VI Semester End (W.E.F. 2019-20)
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. Explain about basic principles and process of Plant tissue culture?
2. write about Sterilization methods of plant tissue culture?
3. Explain about Somatic hybridization

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

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

UNIT III: RECOMBINANT DNA TECHNOLOGY

Essay Questions
1. Explain about Cloning Vectors in rDNA technology
2. Explain about Gene Cloning
3. Write about restriction mapping
4. Write about cDNA libraries in rDNA technology

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

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

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

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII- A-1/ VI Semester End (W.E.F. 2019-20)
CLUSTER ELECTIVE
PLANT DIVERSITY AND HUMAN WELFARE (COURSE: BO6250)

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

UNIT- I: Plant diversity and its scope: **(12h)**

1. Genetic diversity, Species diversity, Plant diversity at the ecosystem level, Agro biodiversity and cultivated plant taxa, wild taxa.
2. Values and uses of biodiversity: Ethical and aesthetic values
3. Methodologies for valuation, Uses of plants.

UNIT-II: Loss of biodiversity: **(12h)**

1. Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agro biodiversity, projected scenario for biodiversity loss
2. Management of plant biodiversity: Organizations associated with biodiversity management Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations, Biodiversity information management and communication.

UNIT-III: Contemporary practices in resource management: **(12h)**

1. Environmental Impact Assessment (EIA), Geographical Information System GIS, Participatory resource appraisal, Ecological footprint with emphasis on carbon footprint, Resource accounting;
2. Solid and liquid waste management

UNIT -IV: Conservation of biodiversity **(12h)**

1. Conservation of genetic diversity, species diversity and ecosystem diversity, *In situ* and *ex situ* conservation,
2. Social approaches to conservation, Biodiversity awareness programmes, Sustainable development

UNIT- V: Role of plants in relation to Human Welfare **(12h)**

1. Importance of forestry, their utilization and commercial aspects-
   A. Avenue trees,
   B. ornamental plants of India
   C. Alcoholic beverages through ages.
2. Fruits and nuts: Important fruit crops their commercial importance. Wood, fiber and their uses.

Suggested Readings:

- Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.
- Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.
- Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

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 International organizations striving for preservation of biodiversity, study of conservation efforts of local people, and civic bodies, study of locally available fruits in different seasons, enumerating the avenue plantations and their diversity in your town/city

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL PAPER – VIII-A1 PRACTICAL SYLLABUS
PLANT DIVERSITY AND HUMAN WELFARE

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

1. Study of plant diversity (flowering plants).
2. Study of exotic species- Identification and morphological characteristics.
3. Identification of forest trees through bark, wood, flowers, leaves and fruits.
4. Maceration, Study of wood (Tracheary elements, fibres).
5. Methods of preservation and canning of fruits.
6. Visit to the local ecosystem to study the plants.
7. Write up on the conservation efforts of International organizations.
8. Study of Solid and Liquid waste management systems in rural/urban areas.

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
(PLANT DIVERSITY AND HUMAN WELFARE)
Botany Practical Model Paper-VIII-A-1 (w.e.f 2019-20)

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. **15 marks**

2. Give the protocol 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 firewood (10 plants),
   timber-yielding trees (10trees) and bamboos.

5. Viva-Voce **05 marks**

6. Practical Record **05 marks**

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50 Marks

KEY

A. Cultivated Plant
B. Wild Plant
C. Exotic plant
D. Preservation and canning of fruits, solid and liquid waste management systems in rural/urban areas
E. Bark/wood/fruit yielding plant
F. Nuts/ Alcoholic beverage plant
G. wood /Fibre yielding plant

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at VI Semester End
Botany Paper VIII-A-1: PLANT DIVERSITY AND HUMAN WELFARE
(Course: BO6250 Model Paper w.e.f. 2019-20)

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

Section – A **3×10 =30M**

Write any THREE of the following questions, Draw neat and labelled diagrams wherever necessary

1. Write a detailed note on conservation of Biodiversity.
2. Write essay on Environmental Impact Assessment.
3. Give a detailed note on Sustainable development of Biodiversity.
4. Explain about important Fruit crops and their economic importance.
5. Explain about types of biodiversity?

Section – B **6×5=30M**

Answer any SIX of the following Questions, Draw neat and labelled diagrams wherever necessary

1. Wild Taxa.
2. Explain about loss of Biodiversity.
3. IUCN.
4. Ecological foot Prints.
5. Species Diversity.
6. Alcoholic Beverages through Ages.
7. Avenue trees.
8. UNEP.
9. Solid Waste management
10. Biodiversity awareness Programme.

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
UNIT- I: Plant diversity and its scope	2	1	20
UNIT-II: Loss of biodiversity	2	1	20
UNIT-III: Contemporary practices in resource management	2	1	20
UNIT -IV: Conservation of biodiversity	2	1	20
UNIT- V: Role of plants in relation to Human Welfare	2	1	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
III B.Sc., -Botany-VIII-A-1 / VI Semester End (W.E.F. 2019-20)
CLUSTER ELECTIVE
PLANT DIVERSITY & HUMAN WELFARE
III B.Sc., -Botany-VIII-A-1/ VI Semester Question Bank

UNIT- I: PLANT DIVERSITY AND ITS SCOPE

Essay Questions
1. Write a detailed note on Agrobiodiversity
2. Explain about types of Biodiversity
3. Explain about values and uses of biodiversity

Short questions
1. Methodologies for valuation in biodiversity
2. Wild taxa
3. Cultivated plant taxa

UNIT-II: LOSS OF BIODIVERSITY

Essay Questions
1. Explain about loss of biodiversity
2. Give a detailed note on conservation of biodiversity
3. Write an essay on management on plant biodiversity

Short notes
1. IUCN
2. UNEP
3. WWF
4. NBPGR

UNIT-III: CONTEMPORARY PRACTICES IN RESOURCE MANAGEMENT

Essay Questions
1. Write Essay on liquid waste management
2. Write Essay on Environmental impact assessment
3. Geographical information system

Short notes
1. Ecological foot prints
2. Resource accounting
3. Solid waste management

UNIT -IV: CONSERVATION OF BIODIVERSITY

Essay Questions
1. Write about conservation of biodiversity
2. Sustainable development of biodiversity

Short notes

1. Social approaches to conservation
2. Biodiversity awareness programmes
3. Species diversity

UNIT- V: ROLE OF PLANTS IN RELATION TO HUMAN WELFARE

Essay Questions

1. Explain about important fruit crops and their economic importance
2. write about utilization and commercial aspects of ornamental plants of India

Short Notes

1. Alcoholic beverages through ages
2. Avenue trees
3. Importance of forestry

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -BotanyVIII-A-2 / VI Semester End (W.E.F. 2019-20)
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, Artemisia annua, 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) *Tribulus terrestris*, f) *Phyllanthus niruri*,
   g) Cassia *auriculata*, h) *Indigofera tinctoria*, i) *Senna auriculata*
   j) *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 2019-20)

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

1. Identify the specimen A- Give reasons (morphological and anatomical) and draw
2. labeled sketches **- 15 marks**
3. Identify and write about the medicinal uses of B-and C- (2x5=) **- 10 marks**
4. Comment on D and E. (2x 4=) **- 08 marks**
5. 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.
6. Viva-voce **- 05 marks**
7. 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. 2019-20)

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

Section – A

3×10 =30M

Write any THREE of the following questions, Draw neat and labelled diagrams wherever necessary

1. Define Ethnobotany? Write an Essay on History, Concept and Scope of Ethnobotany.
2. Write an essay on Trichopus Zylanicus Morphology, Ethnobotany and its role in Modern Medicine
3. Write an Essay on Intellectual property rights
4. Define on Ayurveda? Explain pancha maha bhutas, Saptadhatu and Tridosha concept.
5. Define In-Situ conservation? Give detailed account on Biosphere reserves

Section – B

6×5=30M

Answer any SIX of the following Questions, Draw neat and labelled diagrams wherever necessary

1. Tribal Music and Music instruments.
2. Ocimum Sanctum Ethnobotany.
3. Poly herbal Formulations.
4. Red data Book.
5. Equity Considerations in Traditional Knowledge.
6. Plants used in Siddha medicine.
7. Botanical gardens
8. Curcuma longa.
9. Plants used as Agricultural implements.
10. Plants used by Tribals for edible purpose.

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
UNIT –I: Ethnobotany	2	1	20
UNIT -II: Role of Ethnobotany in Modern Medicine	2	1	20
UNIT-III: Ethnobotany as a Tool to Protect Interests of Ethnic Groups	2	1	20
UNIT -IV: History, Scope and Importance of Medicinal Plants. Indigenous Medicinal Sciences	2	1	20
UNIT -V: Conservation of endangered and endemic medicinal plants	2	1	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
III B.Sc., -Botany-VIII-A-2/ VI Semester End (W.E.F. 2019-20)
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.
3. Write an Essay on Classification of Tribes in India.

Short notes.

1. Write Short notes on Tribal Festivals.
2. Tribal Music and Music instruments.
3. Beverages
4. Plants used by tribals for edible purpose.

UNIT-2: ROLE OF ETHNOBOTANY IN MODERN MEDICINE.

Essay Questions.

1. Write an essay on Trichopus Zylanicus 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 Ethno botany.
3. Ocimum Sanctum ethnobotany
4. Cassia auriculata

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 on plants used as Agricultural implements.

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

Essay Questions.

1. Define on 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.
4. Umur-e- tabi-iyya.

UNIT-V: CONSERVATION OF ENDANGERED AND ENDEMIC MEDICINAL PLANTS

Essay Questions.

1. How can a taxon be Considered endangered?
2. Define In-Situ conservation? Give detailed account on Biosphere reserves.
3. Give a brief account on National parks.
4. 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

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-3 / VI Semester End (W.E.F. 2019-20)
CLUSTER ELECTIVE
PHARMACOGNOSY AND PHYTOCHEMISTRY(COURSE:BO6913)

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 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, phenolics, alkaloids, terpenoids, steroids.
2. A brief idea about extraction of alkaloids.Origin of secondary metabolites – detailed account of acetate pathway, 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, stilbenes, 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 PRACTICAL PAPER – VIII-A-3 PRACTICAL SYLLABUS
PHARMACOGNOSY AND PHYTOCHEMISTRY

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

1. Physical and chemical tests for evaluation of unorganized drugs- Asaphoetida. Honey, Castor oil. Acacia
2. Identification of bark drugs – cinchona, cinnamom
3. Identification of fruit drugs – Cardamom, Coriander
4. Identification of root and rhizome drugs- Ginger, Garlic, Turmeric
5. Identification of whole plant – Aloes, Vinca, Punarnava
6. Herbarium of medicinal plants (minimum of 20 plants)
7. Collection of locally available crude drugs from local venders (minimum of 20)

Domain skills expected to achieve: Identification of various plant parts used as medicines, extraction of active principles from them, isolation by chromatographic techniques, learning callus culture techniques for secondary metabolite enrichment and understanding ethno pharmacological principles

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-VI
(PHARMACOGNOSY AND PHYTOCHEMISTRY)
Botany Practical Model Paper-VIII-A-3 (w.e.f 2019-20)

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

1. Identify the given crude drugs **A & B** by morphological study and chemical tests **- 10 marks**
2. Perform suitable chemical test and identify the given phytochemical **C** **- 10 marks**
3. Comment on D and E (**2x5=)** **- 10 marks**
4. Herbarium and submission of drugs **- 10 marks**
5. Viva-Voce - 0**5 marks**
6. Practical Record - 0**5 marks**

Total = 50 marks

KEY

A. Flower/fruit drugs

B. Rhizome/whole plant drugs

C. Tannins/ phenolics/steroids/ isoprenoids /Asaphoetida/ Honey/ Castor oil/ Acacia

D. Column Chromatography/ Gas Chromatogram/HPLC (photograph/ instrument used for chemical analysis of drugs

E. photograph/instrument used for tissue culture

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. 2019-20)

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

Section – A

3×10 =30M

Write any THREE of the following questions, Draw neat and labelled diagrams wherever necessary

1. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Alstonia Scholaris bark.
2. Define Pharmacognocy. and write essay on classification of Drugs.
3. What are terpenoids? Explain various types of Terpenoids
4. Explain different groups of Alkaloids, biological source, active principles and their Pharmacological action.
5. What are vaccines? Explain various types of Vaccines.

Section – B

6×5=30M

Answer any SIX of the following Questions, Draw neat and labelled diagrams wherever necessary

1. Biological evaluation.
2. Active principles of Nux vomica seeds.
3. Mevalonate Pathway.
4. Coumarins,
5. Antiserum.
6. Importance of Pharmacognocy.
7. Micro scopic studies of vinca leaf.
8. Phenols.
9. Aromatherapy.
10. Antioxidants.

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	SAQ	LAQ	Marks allotted to the Module
UNIT-I: Pharmacognosy	2	1	20
UNIT–II: Organoleptic and microscopic studies	2	1	20
UNIT-III: Secondary Metabolites	2	1	20
UNIT-IV: Phytochemistry	2	1	20
UNIT-V: Enzymes, proteins and amino acids as drugs	2	1	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
III B.Sc., -Botany-VIII-A-3/ VI Semester End (W.E.F. 2019-20)
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.

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 Adhatoda vasica
3. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Strychnos nex vomica.
4. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Rauwolfia serpentina.
5. 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. Microscopic studies of Vinca leaf.
3. Chemical constituents of Ginger.
4. Active principle of Nux-vomica seeds.

UNIT-3: SECONDARY METABOLITES

Essay Questions

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

Short notes.

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

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.
3. What are Tannins? Classify them.
4. What are volatile oils? Classify them on the basis of their functional group.

Short notes

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

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.
4. Write the chemical nature and mode of action of Antibiotics.

Short notes.

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

P R GOVERMENT COLLEGE (AUTONOMOUS), KAKINADA

The **Board of Studies in B.Sc BOTANY** for the academic year 2019-2020 held in April 2019 in Dept. of Botany, Microbiology & Horticulture, PRGC(A), Kakinada.

AGENDA:

The board of studies of a department in the college shall:

1. Adapting affiliated University syllabus for V & VI Semesters
2. Adapting 60- External evaluation and 40- Internal evaluation for V & VI Semesters for the Academic year 2019-20.
3. Conduct of Semester End Practical examinations for I, II, & III Years
4. Approval of MCQ for I Year Students
5. Approval of compulsory projects for III Year Cluster paper
6. Approval of conversion of teaching method for some practical oriented topics through audio & video visuals
7. Approval of student online courses including faculty for the year 2019-20.

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 2019-20.
2. Resolved to change the syllabus for Final Year (V & VI Semesters).
3. Resolved to adopt 60 External, 40 Internal evaluations for all 3 Years students.
4. Resolved to conduct practical for all semesters
5. Resolved to change Cluster A-3 (50 Marks) Practical into 50 Marks Project
6. Resolved to conduct MCQ pattern Mid examination for I Semester only which is in online mode.

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2. **B.RAJA RAJESWARI**
   Contract Faculty in Botany
3. **V. ANITHA**
   Guest Faculty in Botany
4. **G.SRAVANI**
   Guest Faculty in Botany