

# SRI Y.N.COLLEGE (AUTONOMOUS)

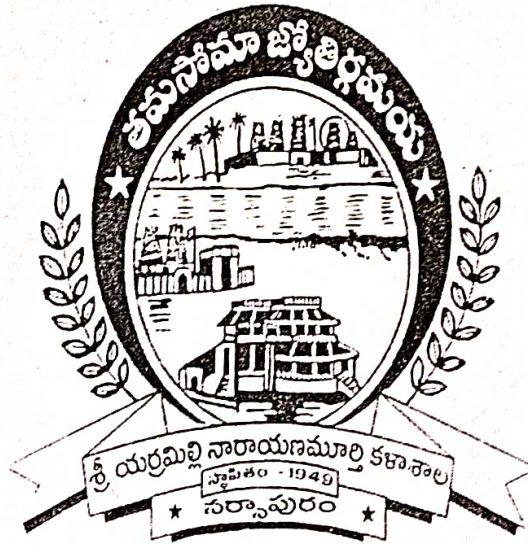
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NARSAPUR - 534 275

(AS PER CBCS AND SEMESTER SYSTEM)  
AP STATE COUNCIL OF HIGHER EDUCATION  
CBCS - PATTERN



## BOTANY SYLLABUS

2016 - 2017

**B.Sc., BOTANY SEMESTER-WISE SYLLABUS  
THEORY, PRACTICALS AND MODEL QUESTION PAPERS  
(AS PER CBCS AND SEMESTER SYSTEM)**

**I, II & III YEARS**

**w.e.f. 2016-17  
(REVISED IN APRIL, 2016)**

**AP STATE COUNCIL OF HIGHER EDUCATION  
CBCS - PATTERN FOR BOTANY**

Andhra Pradesh State Council of Higher Education  
**Structure of B.Sc Botany under CBCS**  
w.e.f. 2016-17 (Revised in April, 2016)

<i>Year</i>	<i>Semester</i>	<i>Paper</i>	<i>Title</i>	<i>Hours</i>	<i>Marks</i>	<i>Credits</i>		
<b>I</b>	<b>I</b>	<b>I</b>	Microbial Diversity , Algae and Fungi	4	100	03		
			Practical –I	2	50	02		
	<b>II</b>	<b>II</b>	Diversity Of Archaeogoniates & Anatomy	4	100	03		
			Practical –II	2	50	02		
<b>II</b>	<b>III</b>	<b>III</b>	Plant taxonomy & Embryology	4	100	03		
			Practical –III	2	50	02		
	<b>IV</b>	<b>IV</b>	Plant physiology & Metabolism	4	100	03		
			Practical –IV	2	50	02		
<b>III</b>	<b>V</b>	<b>V</b>	Cell Biology, Genetics & Plant breeding	3	100	03		
			Practical –V	2	50	02		
		<b>VI</b>	<b>VI</b>	Plant Ecology & Phytogeography	3	100	03	
				Practical –VI	2	50	02	
	*Any one paper from (A), (B) and (C) can be selected	<b>VII (A)*</b>	<b>VII (A)*</b>	Elective	3	100	03	
				Lab	2	50	02	
		<b>VII (B)*</b>	<b>VII (B)*</b>	Elective				
				Lab				
		<b>VII (C)*</b>	<b>VII (C)*</b>	Elective				
				Lab				
		<b>VI</b>	<b>VIII-A</b>	<b>VIII-A</b>	<b>** Cluster Elective-A</b>	3	100	03
					VIII-A-1	3	100	03
	VIII-A-2				3	100	03	
	VIII-A-3				2	50	02	
					2	50	02	
	<b>Or</b>				2	50	02	
<b>** Any one cluster (Set of Three Papers) from VIII-A or VIII-B can be selected</b>	<b>** VIII-B</b>	<b>VIII-B</b>	<b>** Cluster Elective-B</b>					
			VIII-B-1					
			VIII-B-2 VIII-B-3					

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## BOTANY

### I B.Sc – I SEMESTER – PAPER I(A)

#### Microbial Diversity, Algae and Fungi

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

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, Carl concep Woese's-Domain system.
3. Brief account of special groups of bacteria- Archaeobacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria.

#### UNIT- II: VIRUSES

1. Viruses- Discovery, general account, structure& replication of –T4 Phage (Lytic, Lysogenic) and TMV, Viroids, Prions.
2. Plant diseasescaused 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

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

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

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

**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.

## Books for Reference

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

**\*\*Student Activities like Seminars, Assignments, Fieldwork, Study Projects, Models etc. are**

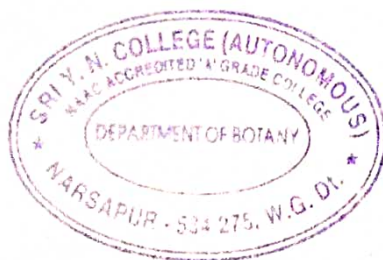
Part of Curriculum for all units in all papers.

### Blue Print (Guidelines to the Paper Setter)

Unit	Essay Questions	Short Note Questions
Unit -I	2	1
Unit - II	2	2
Unit -III	2	1
Unit -IV	2	2
Unit -V	2	2
<b>Total</b>	<b>10</b>	<b>8</b>

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## BOTANY

First year-I Semester- Paper-I(A)  
( Microbial Diversity, Algae and Fungi)

Date:

Max.Marks:75

Time:

Duration: 3 Hrs

### PART-I

NOTE: Draw neat labelled diagrams wherever necessary for questions in Part-I & II  
విభాగము I మరియు II లోని ప్రశ్నలకు అవసరమైనచోట భాగములు గుర్తించిన పటములు వేయుము

Answer any FIVE of the following. Each one carries 5 Marks. 5 x 5=25M

ఈ క్రింది వాటిలో ఏవైనా ఐదంటికి నమాధానము వ్రాయుము. ప్రతి దానికి ఐదు మార్కులు.

- |                                     |                                 |
|-------------------------------------|---------------------------------|
| 1. Mycoplasma                       | మైకోప్లాస్మా                    |
| 2. TMV structure                    | TMV నిర్మాణము                   |
| 3. Bhandi Vein clearing             | బెండలో ఈనెల నిర్మూలము           |
| 4. Conjugation in Bacteria          | బ్యాక్టీరియాలోని సంయుగము        |
| 5. Nanandrus species                | నానాండ్రస్ జాతులు               |
| 6. Tetrasporophyte                  | చతుఃసిద్ధబీజదము                 |
| 7. Asexual reproduction in Rhizopus | రైజోపస్ అలైంగిక ప్రత్యుత్పత్తి. |
| 8. Puccinia Uredosorus              | పక్షీనియ యురిడోసోరస్            |

### PART-II

Answer any FIVE questions, choosing atleast TWO from each section. 5 x 10= 50M

ఏవేని ఐదు ప్రశ్నలకు నమాధానము వ్రాయుము, ప్రతి విభాగము నుండి కనీసం రెండు వ్రాయుము.

#### SECTION-A

9. Explain the different theories regarding evolution of life.  
జీవ పరిణామాన్ని వివరించే వివిధ సిద్ధాంతాలను వివరింపుము.
10. Explain the five kingdom classification of R.H. Whittaker.  
R.H.విట్టేకర్ ఐదు రాజ్యాల వర్గీకరణను వివరింపుము.
11. Describe the replication in bacteriophages.  
బ్యాక్టీరియోఫేజ్ లలో ప్రతికృతిని గూర్చి వర్ణింపుము.
12. Write an essay on transmission of viral diseases in plants.  
మొక్కలలో వ్యాధికారక వైరస్ ల వ్యాప్తిని గూర్చి ఒక వ్యాసము వ్రాయుము.
13. Describe the Bacterial cell structure in detail.  
బాక్టీరియా కణ నిర్మాణము గూర్చి విపులంగా వర్ణింపుము.

**SECTION-B**

14. Write an essay on economic importance of bacteria.

బ్యాక్టీరియా యొక్క ఆర్థిక ప్రాముఖ్యత గూర్చి ఒక వ్యాసము వ్రాయుము.

15. Describe the thallus organisation in Algae.

శైవలాలలోని థాలస్ సంవిధానాన్ని వర్ణించండి.

16. Explain the life history of Ectocarpus

ఎక్టోకార్పస్ జీవిత చరిత్రను వివరింపుము.

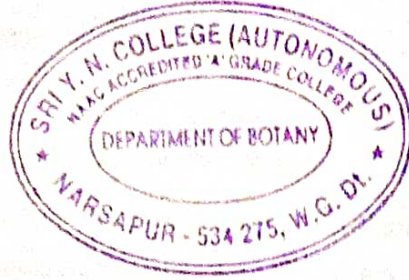
17. Describe the structure and reproduction of Penicillium.

పెన్సిలియం నిర్మాణము మరియు ప్రత్యుత్పత్తిని వర్ణింపుము.

18. Describe the external characters and economic importance of Lichens.

లైకెన్ల బాహ్య లక్షణములు, మరియు ఆర్థిక ప్రాముఖ్యతను వర్ణింపుము.

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**I B.Sc-SEMESTER-I; BOTANY PRACTICAL SYLLABUS**  
**Paper-IA: Microbial Diversity, Algae and Fungi**

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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, Bhandi 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 :
    - a) Cyanobacteria: *Nostoc and Scytonema*.
    - b) Algae: *Oedogonium, Ectocarpus, Polysiphonia*,
    - c) Fungi: *Rhizopus, Penicillium and Puccinia*.
  7. Study of plant material infected by Fungi (Rot of tomatoes, blue and green moulds of Citrus fruits and wheat rust (Section cutting of diseased parts of Wheat and Barberry - identification of different spores).
  8. Lichens: Morphology and anatomy of different thalli.
  9. Field Visit.
- 

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**B.Sc - SEMESTER -I**  
**BOTANY PRACTICAL PAPER -IA**  
**Paper-1 A: Microbial Diversity, Algae and Fungi**

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Time: 3hrs.

Max. Marks: 50

1. Identify giving reasons two of the given Algal mixture". Leave A your preparation for evaluation. Draw labeled diagrams. (Slide--1mark, Diagrams--1mark, Identification--1mark)  
3x 2 = 6 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

9 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. Algal 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.

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## BOTANY

### I B.Sc – II SEMESTER – PAPER I(B)

#### Diversity of Archaeogoniates & Plant Anatomy

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#### UNIT -I: BRYOPHYTES

1. Bryophytes: 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

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

#### UNIT -III: GYMNOSPERMS

1. Gymnosperms: General characters, classification ( up to classes)
2. Morphology, anatomy, reproduction and life history of *Pinus* and *Gnetum*
3. Economic importance with reference to wood, essential oils and drugs

#### UNIT -I V: TISSUES AND TISSUE SYSTEMS

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

1. Anomalous secondary growth in *Bignonia*, *Boerhaavia* and *Dracaena*.
2. Study of local timbers of economic importance-Teak, Rosewood, Red sanders and Arjun (Tella maddi).

**Suggested activity:** Collection of *Marsilea* sporocarp, *Pinus* needles, male and female cones, study of *Pinus* pollen grains, collection of locally available economically useful timbers.

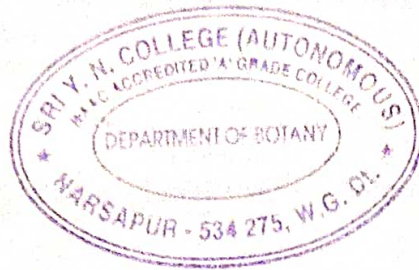
### Books for Reference:

1. Cavers, Frank ( ): The inter-relationships of the Bryophytes  
New Phytologist, Indian Reprint.
2. Smith, G.M. (1955): Cryptogamic Botany Vol. II. (2nd Edition)  
(Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
3. Parihar, N.S. ( ): An Introduction to embryophyta –Vol.II. Bryophyta  
Central Book Depot, Allahabad.
4. Watson, E.V. (1968): British Mosses & Liverworts Cambridge University Press, U.K
5. Eames, A.J. (1936) : Morphology of Vascular Plants (Lower Groups)  
McGraw Hill, N.Y.
6. Parihar, N.S. (19 ) : An Introduction to Embryophyta Vol.II Pteridophyta  
Central Book Depot., Allahabad.
7. Smith, G.M. (1955) : Cryptogamic Botany Vol.II (2nd Edn.,) (Bryophytes &  
Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
8. Sporne, K.R. (1970) : The Morphology of Pteridophytes (The Structure of  
Ferns and Allied Plants) Hutchinson University Library, London
9. Bierhorst, D.W. (1971) : Morphology of Vascular Plants, The MacMillan Co., N.Y.  
& Collier- MacMillan Ltd., London.
10. Coulter, J.M.& C.J. Chamberlain (1964) : Morphology of Gymnosperms  
Central Book Depot, Allahabad.

### Blue Print (Guidelines to the Paper Setter)

Unit	Essay Questions	Short Note Questions
Unit –I	2	2
Unit – II	2	2
Unit –III	2	1
Unit –IV	2	2
Unit –V	2	1
<b>Total</b>	<b>10</b>	<b>8</b>

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**BOTANY Model Question Paper**

**First year-II Semester- Paper-I(B)**

**( Diversity of Achaegoniates and Plant Anatomy)**

Date:

Max.Marks:75

Time:

Duration: 3 Hrs

**PART-I**

**NOTE: Draw neat labelled diagrams wherever necessary for questions in Part-I & II**  
విభాగము I మరియు II లోని ప్రశ్నలకు అవసరమైనచోట భాగములు గుర్తించిన పటములు వేయుము

**Answer any FIVE of the following. Each one carries 5 Marks. 5 x 5=25M**

ఈ క్రింది వాటిలో ఏవైనా ఐదింటికి నమాధానము వ్రాయుము. ప్రతి దానికి ఐదు మార్కులు.

1. Classification of Bryophytes  
బ్రయోఫైట్ల వర్గీకరణ
2. Funaria Archegonial Branch L.S  
ఫ్యూనేరియా స్త్రీ బీజాశయ శాఖ నిలువుకోత
3. Lycopodium cone L.S  
లైకోపోడియం శంకు నిలువుకోత
4. Marsilea Sporocarp  
మార్సీలియా స్పోరోకార్ప్
5. Angiosperm Characters in Gnetum  
నీటమ్లో ఆవృత బీజ లక్షణాలు
6. Phloem  
పోషక కణజాలం
7. Types of Stomata  
పత్రరంధ్ర రకాలు
8. Rose wood  
రోజ్వుడ్

**PART-II**

**Answer any FIVE questions, choosing atleast TWO from each section. 5 x 10= 50M**

ఏవేని ఐదు ప్రశ్నలకు నమాధానము వ్రాయుము, ప్రతి విభాగము నుండి కనీసం రెండు వ్రాయుము.

**SECTION-A**

9. Describe the external and internal structure of the thallus in Marchantia.  
మార్కాంషియాలోని థాలస్యొక్క బాహ్య మరియు అంతర నిర్మాణములను గురించి వివరింపుము.
10. Explain the theories regarding the evolution of sporophytes in Bryophytes.  
బ్రయోఫైట్లలోని సిద్ధబీజద పరిణామాన్ని వివరించే సిద్ధాంతాలను వివరించండి.
11. Describe the internal structure of the Marsilea Rhizome.  
మార్సీలియా కొమ్ము అంతర్నిర్మాణాన్ని వర్ణింపుము
12. Explain the stelar evolution in Pteridophyta.  
టెరిడోఫైటాలోని ప్రసరణ స్తంభ పరిణామమును తెల్పుండి.
13. Describe the Internal structure of Pinus needle and add a note on its xerophytic characters.  
పైనస్ నీడిల్ యొక్క అంతర్నిర్మాణాన్ని వర్ణింపుము. దానిలోని ఎడారి లక్షణములను తెలుపుము.

**SECTION-B**

14. Give an illustrated account of male and female strobili in Gnetum.

నీటమ్లో పురుషశంకువు మరియు స్త్రీ శంకువుల నిర్మాణాన్ని పటముల సహాయంతో వివరించండి.

15. Describe various theories regarding the organisation of shoot apex.

కాండాగ్ర నిర్మాణమును వివరించే వివిధ సిద్ధాంతములను వర్ణించుము.

16. Give an account of Simple Tissues.

సరళ కణజాలాలను గురించి వ్రాయండి.

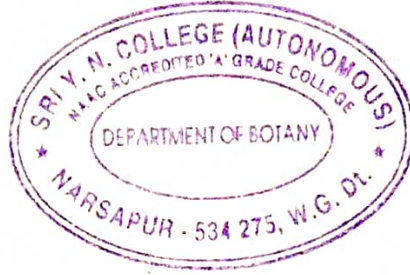
17. Describe the process of anomalous secondary growth in Boerhavia stem.

బోయర్ హావియ కాండములో అసంగత ద్వితీయ వృద్ధిని వివరింపుము.

18. Describe the characters of Tectona grandis (Teak) wood with suitable diagrams and mention its uses.

పటసహాయంతో టెక్టోనా గ్రాండిస్ (టేకు) కలప లక్షణాలు వర్ణింపుము, ఆ కలప యొక్క ఉపయోగాలను తెల్పుండి.

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**I B.Sc SEMESTER -II**  
**BOTANY PRACTICAL SYLLABUS**  
**Paper-IB: Diversity of Archaeogoniates & Plant Anatomy**

---

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 *Bignonia, 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.

**I B.Sc., SEMESTER –II: BOTANY PRACTICAL MODEL PAPER**  
**IB :Diversity of Archaeogoniates & plant Anatomy**

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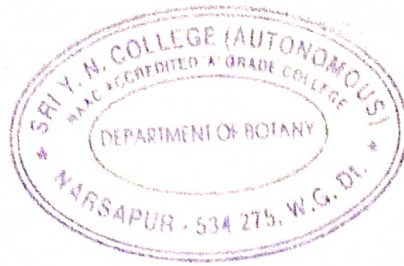
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|---|-----|-----------|
| 1. Section cutting of material      -A<br>(Slide 3 marks, diagrams-3 marks, Identification-3 marks) |     | 9 Marks   |
| 2. Section cutting of material      -B<br>(Slide 3 marks, diagrams-3 marks, Identification-3 marks) |     | 9 Marks   |
| 3. Section cutting of material      -C<br>(Slide 4 marks, diagrams-3 marks, Identification-3 marks) |     | 10 Marks  |
| 4. Identification of spotters - D, E, and F   | 3x4 | =12 marks |
| 5. Record (submission compulsory)   |     | 10 marks  |

-----  
Total : 50 Marks  
-----

**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.
-

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## BOTANY

### II B.Sc – III SEMESTER – PAPER II(A)

#### Plant Taxonomy and Embryology

#### UNIT –I: INTRODUCTION TO PLANT TAXONOMY & CLASSIFICATION

1. Fundamental components of taxonomy (identification, nomenclature, classification)
2. Taxonomic resources: Herbarium- functions & important herbaria, Botanical gardens, Flora, Keys- single access and multi-access.
3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).
4. Types of classification- Artificial, Natural and Phylogenetic.
5. Bentham & Hooker's system of classification- merits and demerits.

#### UNIT –II: SYSTEMATIC TAXONOMY-I

1. Engler & Prantle's system of classification- merits and demerits
2. Phylogeny –origin and evolution of Angiosperms
3. Systematic study and economic importance of the following families:  
Annonaceae, Brassicaceae, Rutaceae, Curcubitaceae, and Apiaceae.

#### UNIT –III: SYSTEMATIC TAXONOMY-II

1. Systematic study and economic importance of plants belonging to the following families:  
Asteraceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, Arecaceae, and Poaceae.

#### UNIT –IV: EMBRYOLOGY-I

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.

#### UNIT –V: EMBRYOLOGY-II

1. Pollination and Fertilization (out lines) Endosperm development and types.
2. Development of Dicot and Monocot embryos, Polyembryony.

### Books for Reference:

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

### Blue Print (Guidelines to the Paper Setter)

Unit	Essay Questions	Short Note Questions
Unit -I	2	1
Unit - II	2	1
Unit -III	2	2
Unit -IV	2	2
Unit -V	2	2
<b>Total</b>	<b>10</b>	<b>8</b>

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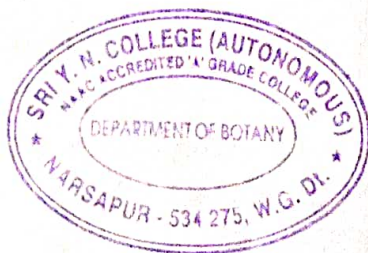
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**BOTANY**

**II B.Sc – III SEMESTER – PAPER II(A)**

**Plant Taxonomy and Embryology**

Date:

Max.Marks:75

Time:

Duration: 3 Hrs

**PART-I**

**NOTE: Draw neat labelled diagrams wherever necessary for questions in Part-I & II**  
విభాగము I మరియు II లోని ప్రశ్నలకు అవసరమైనచోట భాగములు గుర్తించిన పటములు వేయుము

**Answer any FIVE of the following. Each one carries 5 Marks. 5 x 5=25M**

ఈ క్రింది వాటిలో ఏవైనా ఐదింటికి నమాధానము వ్రాయుము. ప్రతి దానికి ఐదు మార్కులు.

1. Binomial Nomenclature ద్వినామీకరణ
2. Essentials organs of Annonaceae అనోనేసిలో ఆవశ్యక అంగాలు
3. Safety mechanism in Asteraceae ఆస్టరేసిలో భద్రత యాంత్రికం
4. Economic importance of Poaceae పోయేసి ఆర్థిక ప్రాముఖ్యత
5. Anther wall పరాగకోశం గోడ
6. Types of Ovules అండాల రకాలు
7. Cellular endosperm కణమయ అంకురచ్ఛదం
8. Dicot embryo ద్విదళబీజ పిండం

**PART-II**

**Answer any FIVE questions, choosing atleast TWO from each section. 5 x 10= 50M**

ఏవేని ఐదు ప్రశ్నలకు నమాధానము వ్రాయుము, ప్రతి విభాగము నుండి కనీసం రెండు వ్రాయుము.

**SECTION-A**

9. Write an essay on International Code of Botanical Nomenclature (ICBN).

అంతర్జాతీయ వృక్షనామీకరణ నియమావళి ( ICBN ) గూర్చి వ్యాసము వ్రాయుము

10. Give an account of Bentham and Hooker's System of Classification Discuss its merits and demerits.

బెంథామ్ మరియు హూకర్ల వర్గీకరణ గూర్చి తెలిపి దాని ప్రతిభలను, లోపాలను చర్చింపుము

11. Give an account of Engler and Prantl system of classification. Discuss its merits and demerits.

ఎంగ్లర్ మరియు ప్రాంటల్ వర్గీకరణ గూర్చి వ్రాసి దాని ప్రతిభలను మరియు లోపాలను తెలుపుము

12. Describe the salient features of Rutaceae family and mention the economic importance of any three plants.

రూటేసి కుటుంబ ముఖ్య లక్షణములు వర్ణింపుము. ఈ కుటుంబానికి చెందిన మూడు మొక్కల

ఆర్థిక ప్రాముఖ్యతను తెలుపుము.

13. Describe the salient features of Asclepiadaceae family.

అస్క్లిపియడేసి కుటుంబ ముఖ్య లక్షణములు వర్ణింపుము.

**SECTION-B**

14. Enumerate the floral characters of Euphorbiaceae family. Mention the botanical names of any three plants of economic importance

యూఫోర్బియేసి కుటుంబ పుష్పలక్షణాలు తెలిపి, ఆర్థిక ప్రాముఖ్యత కలిగిన ఏవైనా మూడు మొక్కల శాస్త్రీయ నామములు తెలుపుము.

15. Describe the Microsporogenesis.

సూక్ష్మ సిద్ధబీజ జననము గురించి వివరింపుము.

16. Describe the development of different types of Embryo sacs you have studied.

నీవు చదువుకున్న వివిధ రకముల పిండకోశముల వృద్ధిని విశదీకరింపుము.

17. Describe the process of fertilization in Angiosperms.

ఆవృతబీజాలలో జరిగే ఫలదీకరణ విధానమును వివరింపుము

18. What is meant by Polyembryony? Explain?

బహుపిండత అనగా అర్థమేమిటి? వివరించండి.

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**II B.Sc BOTANY - SEMESTER-III**  
**Paper-IIA: PRACTICAL**  
**Plant Taxonomy and Embryology**

---

***Suggested Laboratory Exercises:***

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); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
7. Isolation and mounting of embryo (using *Symopsis / Senna / Crotalaria*)
8. Field visits .
9. Study of local flora and submission of Field Note Book.

**II B.Sc., BOTANY- SEMESTER -III**  
**PRACTICAL MODEL PAPER- IIA Plant Taxonomy and Embryology**

---

1. Describe the given Plant specimens A 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.

1 x 15 = 15 Marks

(Description- vegetative - 4 marks, floral –5 marks; diagrams-5 marks, Identification-1 marks)

2. Derive the plant specimens B & C to their respective families- 2x4 = 08 marks
3. Identification of spotters - D, E ,and F (Embryology ) 3x4 =12 marks
4. Herbarium, Record & Viva (submission compulsory) 5 + 10= 15 marks

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Total : 50 Marks  
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## BOTANY

### II B.Sc – IV SEMESTER – PAPER II(B)

#### Plant Physiology and Metabolism

#### UNIT –I: PLANT –WATER RELATIONS BTE

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 TRB

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

#### UNIT –III: PHOTOSYNTHESIS TRB

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, carbon assimilation pathways: C<sub>3</sub>, C<sub>4</sub>, 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 BTE

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 BTE

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.
4. Physiology of Senescence and Ageing.

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

**Books for Reference:**

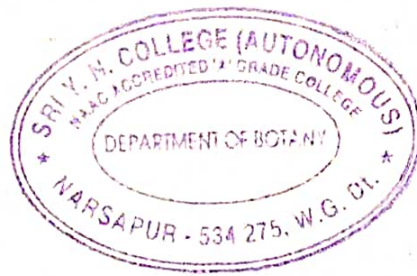
1. Steward, F.C (1964): Plants at Work (A summary of Plant Physiology) Addison-Wesley Publishing Co., Inc. Reading, Massachusetts, Palo alto, London.
2. Devlin, R.M. (1969) : Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi .
3. Noggle, R.& Fritz (1989): Introductory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

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Unit	Essay Questions	Short Note Questions
Unit –I	2	1
Unit – II	2	2
Unit –III	2	2
Unit –IV	2	1
Unit –V	2	2
<b>Total</b>	<b>10</b>	<b>8</b>



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2 *Bh. ...*

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**BOTANY**

**II B.Sc – IV SEMESTER – PAPER II(B)**

**Plant Physiology and Metabolism**

Date:

Max.Marks:75

Time:

Duration: 3 Hrs

**PART-I**

**NOTE: Draw neat labelled diagrams wherever necessary for questions in Part-I & II**

విభాగము I మరియు II లోని ప్రశ్నలకు అవసరమైనచోట భాగములు గుర్తించిన పటములు వేయుము

**Answer any FIVE of the following. Each one carries 5 Marks. 5 x 5=25M**

ఈ క్రింది వాటిలో ఏవైనా ఐదింటికి నమాధానము వ్రాయుము. ప్రతి దానికి ఐదు మార్కులు.

1. Osmosis ద్రవాభిసరణ
2. Transcription అనులేఖనం
3. Lock and Key theory తాళం కప్ప తాళం చెవి సిద్ధాంతం
4. Photosynthetic pigments కిరణజన్యసంయోగక్రియ వర్ణద్రవ్యాలు
5. Source- sink relationship సోర్స్ సింక్ సంబంధం
6. Anaerobic respiration అవాయు శ్వాసక్రియ
7. ABA అబ్ససిసిక్ ఆమ్లం
8. Vernalization వెర్నలైజేషన్

**PART-II**

**Answer any FIVE questions, choosing atleast TWO from each section. 5 x 10= 50M**

ఏవేని ఐదు ప్రశ్నలకు నమాధానము వ్రాయుము, ప్రతి విభాగము నుండి కనీసం రెండు వ్రాయుము.

**SECTION-A**

9. Explain the theories of ascent of sap.  
ద్రవోద్గమము ఎట్లా జరుగుతుందో వివరించే సిద్ధాంతాలను గురించి వ్రాయండి.
10. What is Transpiration? Describe the mechanism of closing and opening of stomata.  
భాష్పోత్సేకం అనగానేమి? పత్రరంధ్ర చలనాలను వివరించే యాంత్రిక విధానాలను వివరించండి.
11. What are Macronutrients? Explain their deficiency symptoms in plants.  
స్థూల పోషకాలు అనగానేమి? మొక్కలలో స్థూల పోషకాల లోప లక్షణాలను వివరింపుము
12. Explain the mechanism of Biological N<sub>2</sub> fixation  
సజీవ నత్రజని స్థాపన యాంత్రికమును వివరింపుము
13. Explain the non Cyclic photophosphorylation.  
అచక్రియ ఫోటో ఫాస్ఫోరిలేషన్ వివరింపుము

**SECTION-B**

14. Describe Calvin's Cycle.

కాల్విన వలయమును వర్ణించుము.

15. Give an account of reactions in Glycolysis

గ్లైకోలసిస్ లోని చర్యలను వివరించుము

16. Explain the reactions in Beta-oxidation.

బీటా ఆక్సికరణంలోని చర్యలను వివరించుము.

17. What are phytohormones? Explain the physiological effects of Auxins in plants?


ఫైటో హార్మోనులు అనగానేమి? మొక్కల శరీర ధర్మ క్రియలపై ఆక్సిన్ల ప్రభావమును విశదీకరించుము.


18. What is Photoperiodism? Describe various aspects of Photoperiodism.


కాంతి కాలావధి అనగా నేమి? దీనికి సంబంధించిన వివిధ అంశాలను వివరించండి.

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**II B. Sc BOTANY SEMESTRE- IV, Paper-IIB: PRACTICAL  
SYLLABUS PAPER-IIB: Plant Physiology and Metabolism**

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**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
6. Demonstration of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of photosynthesis under varying Co<sub>2</sub> concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmott'. bubbler

**II B. Sc –SEMESTER- IV, BOTANY PRACTICAL MODEL PAPER  
PAPER- IIB - Plant Physiology and Metabolism**

1. Perform the Experiments A & B. Give the aim, principle, procedure and observation. Tabulate the results if any. Draw labeled diagram. 2 x 15= 30 marks
2. Give the protocol of the experiments C & D 2 x 5 = 10 marks
3. Record & Viva 10 marks



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### BOTANY

III B.Sc - V SEMESTER – PAPER III(A)

(TAXONOMY & MEDICINAL BOTANY)

#### TAXONOMY

##### UNIT – I

- Historical account – Artificial, Natural and Phylogenetic systems of classification.
- Principles of classification.
- Bentham and Hooker's system – classification in brief, merits and demerits.
- Engler and Prantle's system – classification in brief; merits and demerits.
- Comparison between Bentham and Hooker's system and Engler and Prantle's system of classifications.
- Omega taxonomy- Chemotaxonomy, Cytotaxonomy.
- A brief account of International Code of Botanical Nomenclature(ICBN)

##### UNIT – II

- Important plants, description, distinguishing characters and economic importance of the following.
  1. Annonaceae 2. Rutaceae 3. Malvaceae 4. Fabaceae 5. Caesalpinaceae
  6. Mimosaceae 7. Cucurbitaceae 8. Apiaceae 9. Asteraceae
  10. Asclepiadaceae 11. Lamiaceae. 12. Euphorbiaceae 13. Orchidaceae 14. Poaceae

#### Medicinal Botany

##### UNIT-III

- **Plants in Primary Health Care:** Common Medicinal plants –Tulasi (Ocimum sanctum),Turmeric(Curcuma longa), Karaka (Terminalia chebula), Vepa(Azadiracta indica), Kalabanda (Aloe vera), Tippa Teega(Tinospora cordifolia).
- **Traditional medicina Vs. Modern medicine:** Study of select plant examples used in Traditional medicine as resource. (Active principles, structure, usage and Pharmacological action) of modern medicine: Aswagandha (Withania somnifera), Sarpagandha (Rauvolfia serpentina), Amla (Emblica officinalis), Nelavemu (Andrographis paniculata).

##### UNIT-IV

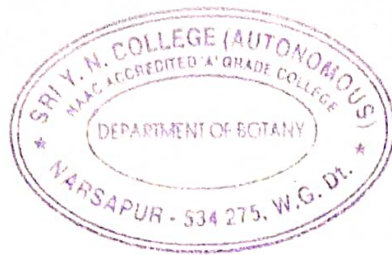
- Ethnomedicine, Outlines of Ayurveda, Siddha, Unani and Homeopathic systems of traditional medicine.
- Indian Pharmacopoeia, AYUSH, NMPB, CIMAP and CDRI.

#### **Blue Print (Guidelines to the Paper Setter)**

Unit	Essay Questions	Short Note Questions	Bit Questions
Unit –I	2	2	Atleast one bit question from each unit.
Unit – II	2	2	
Unit –III	2	2	
Unit –IV	2	2	
<b>Total</b>	<b>8</b>	<b>8</b>	<b>6</b>

- For Mid I – Unit I & II
- For Mid II-Unit III & IV

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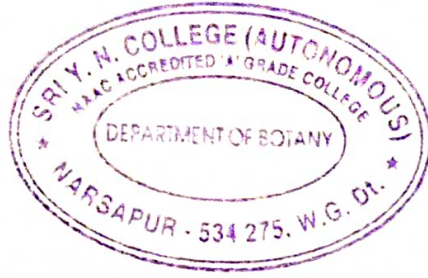


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**Suggested Readings:**

1. Common Core Botany by Vikas Publications.
2. Telugu Academy – Pindotpatti Sastram.
3. Principles of Angiosperms Taxonomy by Davis, V.H. Hey wood.
4. Pharmacognosy by Kokate.C and Gokeale
5. A Hand Book of Medicinal Plants by Prajapathi, Purohit, Sharma and Kumar.
6. Medicinal Plants by Joshi
7. .Ayurveda The Science of Self Healing by Lad.V

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BOTANY

III B.Sc-V Semester- Paper-III(A)  
(TAXONOMY & MEDICINAL BOTANY)

Date: Max.Marks:75  
Time: Duration: 3 Hrs

I. Answer any FOUR questions, atleast TWO from each section. 4 x 12= 48M

NOTE: Draw neat labelled diagrams wherever necessary for questions in Section A & B

ఏవేని నాలుగు ప్రశ్నలకు నమాధానము వ్రాయుము, ప్రతీ విభాగము నుండి కనీసం రెండు వ్రాయుము.  
విభాగము 'ఎ' మరియు 'బి' లోని ప్రశ్నలకు అవసరమైనచోట భాగములు గుర్తించిన పటములు వేయుము

SECTION-A

1. Give an account of Bentham and Hooker's System of Classification Discuss its merits and demerits.

బెంథామ్ మరియు హూకర్ల వర్గీకరణ గూర్చి తెలిపి దాని ప్రతిభలను, లోపాలను చర్చింపుము

2. Write an essay on International Code of Botanical Nomenclature (ICBN).

అంతర్జాతీయ వృక్షనామకరణ నియమావళి ( ICBN ) గూర్చి వ్యాసము వ్రాయుము

3. Describe the salient features of Asclepiadaceae and mention the economic importance of any three plants?

ఆస్ట్రిపియడేసి కుటుంబ ముఖ్య లక్షణములు వర్ణింపుము. ఈ కుటుంబానికి చెందిన మూడు మొక్కల ఆర్థిక ప్రాముఖ్యతను తెలుపుము.

4. Describe the characteristic features of the family Poaceae, Add a note on its economic importance.

పోయేసి కుటుంబ లక్షణాలు వర్ణించి, దాని ఆర్థిక ప్రాముఖ్యతను తెలుపుము.

SECTION-B

5. Give an account of biological source, chemical constituents and medicinal value of Tulasi and Turmeric.

తులసి మరియు పసుపు యొక్క జీవ వనరు, రసాయన సంశ్లేషణ పదార్థాలు మరియు ఔషధ ఉపయోగాలను గురించి వ్రాయుము.

6. Given an account of morphology of Aswagandha with active principle and therapeutic uses.

అశ్వగంధ బాహ్య స్వరూపము వర్ణించి అందలి రసాయన పదార్థాలను మరియు వైద్య చికిత్సలో దీని ఉపయోగాలు తెలుపుము.

7. Write an essay on Ayurveda system of Medicine.

ఆయుర్వేద వైద్య విధానం గురించి ఒక వ్యాసం వ్రాయండి.

8. Write an essay on Homoeopathi system of Medicine.

హోమియోపతి వైద్య విధానం గురించి ఒక వ్యాసం వ్రాయండి.



**SECTION-C**

**II. Write notes on any FIVE of the following. Each one carries 3 Marks. 5 x 3 =15M**

ఈ క్రింది వాటిలో ఏవైనా ఐదింటికి లఘుటీక వ్రాయుము. ప్రతి దానికి మూడు మార్కులు.

- |                                     |                                 |
|-------------------------------------|---------------------------------|
| 9. Binomial nomenclature            | ద్విసామీకరణము                   |
| 10. Chemotaxonomy                   | రసాయనాధార వర్గీకరణ              |
| 11. Papilionaceous corolla          | పేపిలియోనేసియస్ ఆకర్షణ పత్రావళి |
| 12. Fruit in Apiaceae               | ఎపియేసిలోని ఫలము                |
| 13. Medical Importance of Aloe vera | కలబంద ఔషధ ప్రాముఖ్యత            |
| 14. Medical uses of Amla            | ఉసిరి యొక్క ఔషధ ఉపయోగాలు        |
| 15. AYUSH                           | ఆయుష్                           |
| 16. Indian Pharmacopoeia            | ఇండియన్ ఫార్మకోపియా             |

**SECTION-D**

**III. Answer ALL the following questions in two or three sentences in the same serial order at one place (Diagrams not necessary) Each one carries Two Marks. 6 x 2=12M**

ఈ క్రింది అన్ని ప్రశ్నలకు రెండు లేదా మూడు వాక్యాలలో ఒకే చోట నమాధానం వ్రాయుము.

(వటములు అవసరం లేదు) ప్రతి దానికి రెండు మార్కులు.

- |                                 |                    |
|---------------------------------|--------------------|
| 17. Phylogenetic Classification | వర్గవికాస వర్గీకరణ |
| 18. Lever mechanism             | లీవర్ యాంత్రికం    |
| 19. Rostellum                   | రోస్టెల్లమ్        |
| 20. Alcoloids in Neem           | వేపలో ఆల్కలాయిడ్స్ |
| 21. Ethanobotany                | ఎథనోబోటని          |
| 22. CIMAP                       | CIMAP              |

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**BOTANY**

**III B.Sc - VI SEMESTER – PAPER III(B)**

**(PLANT GENETICS, ECOLOGY & BIODIVERSITY)**

**GENETICS**

**UNIT -I**

- **Mendelism:** Laws of inheritance. Genetic interactions - Epistasis, complementary supplementary and inhibitory genes
- **Linkage and crossing over:** A brief account, construction of genetic maps – 2 point and 3 point test cross data.

**UNIT -II**

- **Mutations:** Chromosomal aberrations - structural and numerical changes; Gene mutations, transposable elements.
- **Gene Expression:** Organisation of gene, mechanism and regulation of gene expression in prokaryotes (Lac. Operon ).
- **Extra nuclear genome:** Mitochondrial and plastid DNA, plasmids.

**UNIT -III**

**ECOLOGY**

- **Concept and components of Ecosystem.** Energy flow, food chains, food webs, ecological pyramids, biogeochemical cycles - Carbon, Nitrogen.
- **Plants and environment:** Ecological factors - Climatic (light and temperature), edaphic and biotic. Ecological adaptations of plants, ecological succession (Hydrosere, Xerosere).
- **Production ecology:** Concepts of productivity, GPP, NPP, CR (Community Respiration) and secondary production, P/R ratio and Ecosystems.

**UNIT -IV**

**BIODIVERSITY**

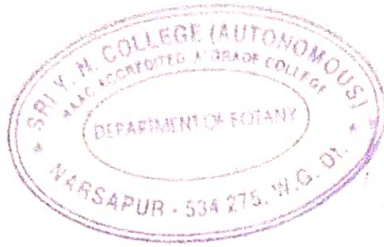
- **Biodiversity:** Concepts, Convention on Biodiversity - Earth Summit. Types of Biodiversity, Levels, threats and value of Biodiversity.
- **Hot spots of India :** Endemism, North Eastern Himalayas, Western Ghats.
- **Vavilov centres of crop plants.**
- **Principles of conservation:** IUCN threat-categories, RED data book - threatened & endangered plants of India. Role of organisations in the conservation of Biodiversity - IUCN, UNEP, WWF, NBPGR, NBD.


**Blue Print (Guidelines to the Paper Setter)**

- For Mid I – Unit I & II
- For Mid II-Unit III & IV

Unit	Essay Questions	Short Note Questions	Bit Questions
Unit –I	2	2	Atleast one bit question from each unit.
Unit – II	2	2	
Unit –III	2	2	
Unit –IV	2	2	
<b>Total</b>	<b>8</b>	<b>8</b>	<b>6</b>

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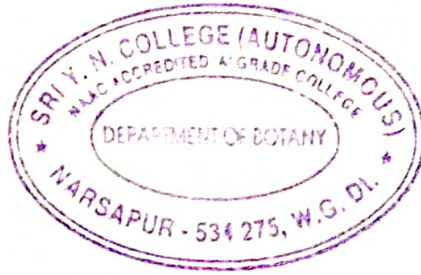
6 V. L. Bhavani

7

## Suggested Readings:

1. Common Core Botany – Vikas Publications.
2. Telugu Academy Publication.
3. Genetics by P.K.Gupta.
4. Principles of Genetics by Gardner.
5. Principles of Genetics by Sinnot.
6. A text book of Plant Ecology by R.S.Ambasht.
7. Ecology by Eugene P.Odum.
8. Ecology and Environment by P.D.Sharma.
9. Modern Concepts of Ecology by H.D.Kumar.
10. Ecology Principles and Application by J.L.Chapman & M.J.Raiss.
11. Aavarana Sashtram – Telugu academy.

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**BOTANY**

**III B.Sc-VI Semester- Paper-III(B)  
(PLANT GENETICS, ECOLOGY & BIODIVERSITY)**

Date: Max.Marks:75

Time: Duration: 3 Hrs

I. Answer any FOUR questions, atleast TWO from each section. 4 x 12= 48M

NOTE: Draw neat labelled diagrams wherever necessary for questions in Section A & B

ఏవేని నాలుగు ప్రశ్నలకు నమాధానము వ్రాయుము, ప్రతి విభాగము నుండి కనీసం రెండు వ్రాయుము.

విభాగము 'ఎ' మరియు 'బి' లోని ప్రశ్నలకు అవసరమైనచోట భాగములు గుర్తించిన పటములు వేయుము

**SECTION-A**

1. Describe the Mendel's Laws of Inheritance.  
మెండల్ అనువంశిక సూత్రాలను వివరించండి.
2. What is crossing over? Describe the mechanism of crossing over.  
వినిమయం అనగానేమి? వినిమయం యాంత్రికంను వివరించండి.
3. Explain the structural mutations in Chromosomes.  
నిర్మాణాత్మక సంబంధమైన క్రోమోసోముల ఉత్పరివర్తనాలను వివరించండి.
4. Give an account of Lac.Operon model for gene expression.  
లాక్ ఓపరాన్ భావన ద్వారా జన్యు వ్యక్తీకరణను వివరింపుము.

**SECTION-B**

5. What are Ecological Pyramids? Describe the Pyramids of number biomass and energy  
ఇకలాజికల్ పిరమిడ్లు అంటే ఏమిటి? సంఖ్యా సంబంధ, జీవ ద్రవ్యరాశి సంబంధ మరియు శక్తి సంబంధ పిరమిడ్లను వివరించండి.
6. Describe the hydrosere type of Succession.  
జల అనుక్రమము గురించి వివరించండి.
7. What is Biodiversity? Explain the types of Biodiversity?  
జీవవైవిధ్యం అనగానేమి? జీవవైవిధ్యం రకాలను వివరించండి.
8. Write an essay on international efforts for conservation of Biodiversity?  
జీవవైవిధ్యం సంరక్షణకు అంతర్జాతీయ స్థాయిలో కృషిచేస్తున్న సంస్థల గురించి ఒక వ్యాసం వ్రాయుము.

**SECTION-C**

**II. Write notes on any FIVE of the following. Each one carries 3 Marks. 5 x 3 =15M**

ఈ క్రింది వాటిలో ఏవైనా ఐదంటికి లఘుటిక వ్రాయుము. ప్రతి దానికి మూడు మార్కులు.

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| 9. Epistasis                      | ఎపిస్టాసిస్                         |
| 10. Two-point test cross          | రెండు జన్యువుల పరీక్ష సంకరణం        |
| 11. Transposable genetic elements | ట్రాన్స్పోజబుల్ జెనిటిక్ ఎలిమెంట్స్ |
| 12. Plasmids                      | ప్లాస్మిడ్లు                        |
| 13. Carbon Cycle                  | కర్బన వలయము                         |
| 14. Secondary production          | ద్వితీయ ఉత్పాదకత                    |
| 15. Earth Summit                  | ధరిత్రీ సదస్సు                      |
| 16. Endemic species of India      | భారతదేశంలో అంతరించిపోతున్న జాతులు   |

**SECTION-D**

**III. Answer ALL the following questions in two or three sentences in the same serial order at one place (Diagrams not necessary) Each one carries Two Marks.**

**6 x 2=12M**

ఈ క్రింది అన్ని ప్రశ్నలకు రెండు లేదా మూడు వాక్యాలలో ఒకే చోట సమాధానం వ్రాయుము.  
(వటములు అవసరం లేదు) ప్రతి దానికి రెండు మార్కులు.

- |                      |                 |
|----------------------|-----------------|
| 17. Complete Linkage | సంపూర్ణ సహలగ్నత |
| 18. Trisomics        | ట్రైసోమిక్లు    |
| 19. Muton            | మ్యూటాన్        |
| 20. Food Web         | ఆహారపు వల       |
| 21. Soil Texture     | మృత్తిక వయనము   |
| 22. Red Data Book    | రెడ్ డేటా బుక్  |

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1 T R

2 B. S. S.

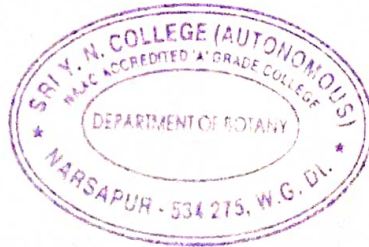
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5 N. Nagavardhanam.

6 V. L. Bhevari

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**Botany Practical – III**

**(TAXONOMY, MEDICINAL BOTANY, GENETICS, ECOLOGY & BIODIVERSITY)**

➤ **TAXONOMY**

- Identification, Technical description of the plants and their assignment to the respective families as mentioned in theory.
- Demonstration of Herbarium techniques.
- Preparation and submission of 25 Herbarium specimens for evaluation during the practical examination.

➤ **MEDICINAL BOTANY**

- Detailed morphological and anatomical study of medicinally important parts of locally available plants used in traditional medicine.

➤ **GENETICS**

- Solving genetic problems related to monohybrid, dihybrid ratio and interaction of genes (minimum of six problems in each topic).
- Construction of linkage maps; two point test cross.

➤ **ECOLOGY & BIODIVERSITY**

- Knowledge of ecological instruments: Working principles and applications of Hygrometer, rain gauge, anemometer, altimeter, light meter, wet and dry bulb thermometer (with the help of Equipment / diagrams/ photographs).
- Determination of soil texture (composition of clay, sand silt etc.) and pH.
- Study of morphological and anatomical characteristics of plant communities using locally available plant species: Hydrophytes (*Eichhornia, Hydrilla, Pistia, Vallisneria*), Xerophytes (*Asparagus, Opuntia, Casuarina*) and Halophytes (*Rhizophora, Arecenia*).
- Determination of Transparency of water.
- Geographical spotting of certain endemic and endangered plant species of AP. Minimum of two field visits to local areas of ecological / conservation of biodiversity importance (Sacred grove / Reserved forest / Botanical garden / Zoo Park / Lake etc.).

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3

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**BOTANY PRACTICAL III- AT THE END OF FIFTH SEMESTER**

**TIME: 1½ Hrs**

**MARKS: 20**

I. Describe A with technical terms draw twig, L.S. of flower, T.S. of ovary and floral diagrams, give floral formula. 12M

Description veg- 3M, Floral des – 4M, Diagrams – 5M

II. Identify 'B' and 'C' and give medicinal uses with active principle involved.

Identification – 1; Active Principle – 1; Uses – 2 (2X4) = 8.M

**BOTANY PRACTICAL III - AT THE END OF SIXTH SEMESTER**

**TIME: 1½ Hrs**

**MARKS: 20**

I. Solve the genetic problem 'A' 10M

II. Identify and write notes on B & C (2)5 =10M

B = Hydrophytes / Xerophytes / Halophytes

C = Biodiversity photographs



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1 T Raghav

2 Bh. Raghav

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**BOTANY PRACTICAL III - AT THE END OF THIRD YEAR**

---

**TIME: 3 Hrs**

**MARKS: 75**

I. Describe 'A' with technical terms draw twig, L.S. of flower, T.S. of ovary and floral diagrams, give floral formula. 12M

Description veg- 3M, Floral des - 4M, Diagrams - 5M

II. Write the Herbarium technique and identify the Herbarium Sheets 'B' & 'C'

8 M

Herbarium technique- 4M, 'B' & 'C'- 4M

III. Identify 'D' and 'E' and give medicinal uses with active principle involved.

Identification - 1; Active Principle - 1; Uses - 2 (2X4) = 8M

IV. Solve the given genetics problem 'F'.

10M.

V. Ecology - Soil pH / Soil Profile/ Water transparency

10M

Explanation: 06 marks

Diagram/ Table: 04 marks.

VI. Ecological instruments. (Identification & Working condition)

04M

VII. Ecological adaptations (Xerophytes / Hydrophytes / Halophytes)

04M

VIII. Photograph- Biodiversity (North Himalayas/ Western Ghats)

04M

IX. Certified Record, Field visit and viva

10+3+2=15M

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2. Bh. ...

3

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5 - N. Nagarajdhanam.

6 V. L. Bhavani

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T. R. ...  
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**BOTANY**

**III B.Sc - V SEMESTER – PAPER IV(A)**

**(Physiology, Tissue Culture & Biotechnology)**

**PHYSIOLOGY (Part A)**

**UNIT -I**

- **Water Relations:** Diffusion, imbibition, osmosis; water, osmotic and pressure potentials; absorption, transport of water, ascent of sap; transpiration; Stomatal structure and movements.
- **Enzymes:** Nomenclature, characteristics, mechanism and regulation of enzyme action, factors regulating enzyme action.

**UNIT -II**

- **Photosynthesis:** Photosynthetic pigments, Red drop and Emerson enhancement effect; concept of two photosystems, mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation;
- **Carbon assimilation pathways:** C<sub>3</sub>, C<sub>4</sub> and CAM; photorespiration.

**TISSUE CULTURE & BIOTECHNOLOGY**

**UNIT -III**

- **Tissue culture:** Introduction, sterilization procedures, culture media - composition and preparation; explants.
- **Callus culture;** cell and protoplast culture, Somatic hybrids and cybrids.
- **Applications of tissue culture:** Production of pathogen free plants and somaclonal variants, production of stress resistance plants, secondary metabolites and synthetic seeds.

**UNIT -IV**

- **Biotechnology:** Introduction, history and scope.
- **r-DNA technology:** Vectors and gene cloning and transgenic plants.

**Blue Print (Guidelines to the Paper Setter)**

- For Mid I – Unit I & II
- For Mid II-Unit III & IV

Unit	Essay Questions	Short Note Questions	Bit Questions
Unit –I	2	2	Atleast one bit question from each unit.
Unit – II	2	2	
Unit –III	2	2	
Unit –IV	2	2	
<b>Total</b>	<b>8</b>	<b>8</b>	<b>6</b>

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- 6 V. L. Bhevari
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**Suggest Readings:**

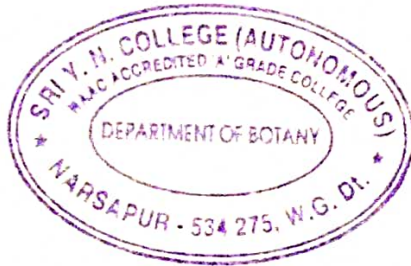
**PLANT PHYSIOLOGY:**

1. Common Core Botany – Vikas Publications.
2. Telugu Academy – Vruksha Sareera Dharma Sastram.
3. Plant Physiology by Devlin.
4. Plant Physiology by Devlin and Witham.
5. Plant Physiology by Noggle and Fritz.
6. Plant Physiology by Salisbury and Ross.

**TISSUE CULTURE & BIOTECHNOLOGY:**

1. Common Core Botany – Vikas Publications.
2. Telugu Academy Publication.
3. A text book of Biotechnology by R.C.Dubey.
4. Elements of Biotechnology by P.K.Gupta.

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2 *Dr. S. S. Reddy*

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5 *N. Nagavardhanam*

6 *V. L. Bhavani*

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**BOTANY**

**III B.Sc-V Semester- Paper-IV(A)  
(PHYSIOLOGY, TISSUE CULTURE & BIOTECHNOLOGY)**

Date: Max.Marks:75

Time: Duration: 3 Hrs

I. Answer any FOUR questions, atleast TWO from each section. 4 x 12= 48M

NOTE: Draw neat labelled diagrams wherever necessary for questions in Section A & B

ఏవేని నాలుగు ప్రశ్నలకు నమాధానము వ్రాయుము, ప్రతీ విభాగము నుండి కనీసం రెండు వ్రాయుము.

విభాగము 'ఎ' మరియు 'బి' లోని ప్రశ్నలకు అవసరమైనచోట భాగములు గుర్తించిన పటములు వేయుము

**SECTION-A**

1. Explain the theories of ascent of sap.

ద్రవోద్గమము ఎట్లా జరుగుతుందో వివరించే సిద్ధాంతాలను గురించి వ్రాయండి.

2. Describe the mechanism of enzyme action.

ఎంజైమ్ చర్యా యాంత్రికమును గూర్చి వర్ణింపుము.

3. Explain the non Cyclic photophosphorylation.

అచక్రియ ఫోటో ఫాస్ఫోరిలేషన్ వివరింపుము.

4. Describe Calvin's Cycle / C3 Cycle/ PCR Cycle.

కాల్విన్ వలయము/ C3 వలయం/ PCR వలయము వర్ణింపుము.

**SECTION-B**

5. Write an essay on different aspects coming across in Tissue Culture.

కణజాల వర్ధనములోని వివిధ అంశములపై వ్యాసము వ్రాయుము.

6. Write an essay on Protoplast Culture.

జీవపదార్థక వర్ధనం గూర్చి వ్యాసము వ్రాయుము.

7. Write an essay on Biotechnology and its applications in various fields studied by you.

నీవు చదువుకున్న వివిధ రంగములలో బయోటెక్నాలజీ ఉపయోగములను గూర్చి వ్రాయుము.

8. Write an essay on r-DNA Technology.

పునఃసంయోజక డి.ఎన్.ఎ సాంకేతిక పరిజ్ఞానము గూర్చి వ్యాసము వ్రాయుము.

**SECTION-C**

**II. Write notes on any FIVE of the following. Each one carries 3 Marks. 5 x 3 =15M**  
ఈ క్రింది వాటిలో ఏవైనా ఐదంటికి లభ్యుటిక ప్రాయము. ప్రతి దానికి మూడు మార్కులు.

9. Plasmolysis	కణద్రవ్యసంకోచం
10. Enzymes Nomenclature	ఎంజైముల నామీకరణ
11. Photosystem I	కాంతివ్యవస్థ I
12. CAM Cycle	CAM వలయం
13. Cybrids	కణద్రవ్యజ సంకరాలు
14. Synthetic seeds	కృత్రిమ విత్తనములు
15. Vectors	వాహకాలు
16. Transgenic Plants	జన్యుపరివర్తిత మొక్కలు

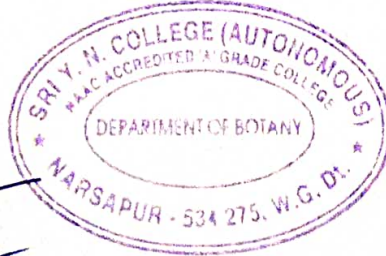
**SECTION-D**

**III. Answer ALL the following questions in two or three sentences in the same serial order at one place (Diagrams not necessary) Each one carries Two Marks. 6 x 2=12M**

ఈ క్రింది అన్ని ప్రశ్నలకు రెండు లేదా మూడు వాక్యాలలో ఒకే చోట నమాధానం ప్రాయము.  
(వటములు అవనరం లేదు) ప్రతి దానికి రెండు మార్కులు.

17. Transpiration	భాష్పోత్సేకం
18. Turn over Number	టర్నోవరు సంఖ్య
19. Red drop	అరుణ పతనం
20. Explant	ఎక్స్ ప్లాంట్
21. Interferons	ఇంటర్ ఫెరాన్లు
22. Totipotency	టాటి పోటెన్సీ

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**BOTANY**

III B.Sc –VI Semester ; Paper – IV (B)

( Physiology, Seed Technology & Horticulture)

**PHYSIOLOGY (Part B)**

**UNIT -I**

- **Respiration:** Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation.
- **Nitrogen Metabolism:** Biological nitrogen fixation, nitrate reduction, protein synthesis.

**UNIT –II**

- **Phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene.**
- **Physiology of flowering and photoperiodism, role of phytochrome in flowering.**

**SEED TECHNOLOGY**

**UNIT –III**

- **Seed:** Structure and types. Seed dormancy; causes and methods of breaking dormancy.
- **Seed storage:** Seed banks, factors affecting seed viability, genetic erosion. Seed production technology; seed testing and certification.

**HORTICULTURE**

**UNIT -IV**

- **Horticulture techniques:** Introduction, Cultivation of ornamental and vegetable crops, Bonsai and landscaping.
- **Floriculture:** Introduction. Importance of green house, Polyhouse, mist chamber, shade nets; Micro irrigation systems. Floriculture potential and its trade in India
- **Vegetative Propagation of plants:** Stem, root and leaf cuttings. Layering and grafting.

**Blue Print (Guidelines to the Paper Setter)**

- For Mid I – Unit I & II
- For Mid II-Unit III & IV

Unit	Essay Questions	Short Note Questions	Bit Questions
Unit –I	2	2	Atleast one bit question from each unit.
Unit – II	2	2	
Unit –III	2	2	
Unit –IV	2	2	
<b>Total</b>	<b>8</b>	<b>8</b>	<b>6</b>

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- 1 T R...
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- 5 N. Nagaraj...
- 6 V. L. Bhevari
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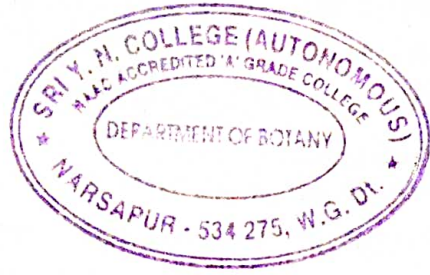


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**Suggested Readings:**

1. Common Core Botany – Vikas Publications.
2. Telugu Academy – Vruksha Sareera Dharma Sastram.
3. Plant Physiology by Devlin.
4. Plant Physiology by Devlin and Witham.
5. Plant Physiology by Noggle and Fritz.
6. Plant Physiology by Salisbury and Ross.

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- 5 N. N. N. N.
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**BOTANY**

**III B.Sc-VI Semester- Paper-IV(B)  
(PHYSIOLOGY, SEED TECHNOLOGY & HORTICULTURE)**

Date: Max.Marks:75  
Time: Duration: 3 Hrs

I. Answer any FOUR questions, atleast TWO from each section. 4 x 12= 48M

NOTE: Draw neat labelled diagrams wherever necessary for questions in Section A & B

ఏవేని నాలుగు ప్రశ్నలకు నమాధానము వ్రాయుము, ప్రతి విభాగము నుండి కనీసం రెండు వ్రాయుము.  
విభాగము 'ఎ' మరియు 'బి' లోని ప్రశ్నలకు అవసరమైనచోట భాగములు గుర్తించిన పటములు వేయుము

**SECTION-A**

1. Give an account of reactions in Krebs cycle.  
క్రెబ్స్ వలయంలోని చర్యలను వివరింపుము.
2. Explain the mechanism of Biological Nitrogen fixation.  
సజీవ నత్రజని స్థాపన యాంత్రికమును వివరింపుము
3. What are phytohormones? Explain the physiological effects of Auxins and Gibberellins in plants?  
ఫైటో హోర్మోనులు అనగానేమి? మొక్కల శరీర ధర్మ క్రియలపై ఆక్సిన్ల మరియు జిబ్బెరెల్లిన్ల ప్రభావమును విశదీకరించుము.
4. What is Photoperiodism? Describe various factors of Photoperiodism.  
కాంతి కాలావధి అనగా నేమి? దీనికి సంబంధించిన వివిధ అంశాలను వివరించండి.

**SECTION-B**

5. What is Seed dormancy? Describe in detail about the reason for seed dormancy and methods used to break dormancy.  
విత్తన సుప్తావస్థ అనగానేమి? విత్తనాలలో సుప్తావస్థకు కారణాలను వివరించి, వాటిని అధిగమించే పద్ధతులను గురించి వ్రాయండి..
6. Write an essay on Seed Bank.  
సీడ్ బ్యాంకును గూర్చి వ్యాసము వ్రాయుము.
7. What is Micro Irrigation? Describe different types of microirrigation systems.  
సూక్ష్మతరహా నీటి పారుదల అనగానేమి? సూక్ష్మతరహా నీటి పారుదల వివిధ రకాలను వర్ణింపుము.
8. What is Vegetative Propagation? Describe various methods of Vegetative Propagation.  
శాఖీయ ప్రవర్ధనం అనగానేమి? వివిధ రకాల శాఖీయ ప్రవర్ధన విధానాలను వివరింపుము.



### SECTION-C

II. Write notes on any FIVE of the following. Each one carries 3 Marks. 5 x 3 = 15M

ఈ క్రింది వాటిలో ఏవైనా ఐదంటికి లభించే ప్రతి దానికి మూడు మార్కులు.

9. Formation of Acetyl co 'A'	ఎసిటైల్ కో ఎన్జైమ్ ఏ ఏర్పడుట
10. Transcription	అనులేఖనము
11. ABA	అబ్ససిసిక్ ఆమ్లం
12. Phytochrome	ఫైటోక్రోమ్
13. Genetic Erosion	జెనెటిక్ ఇరోజన్
14. Seed Testing	విత్తన పరీక్ష
15. Bonsai	బోన్సాయ్
16. Green House	గ్రీన్ హౌస్

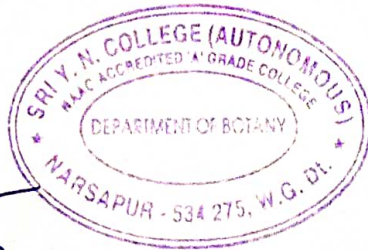
### SECTION-D

III. Answer ALL the following questions in two or three sentences in the same serial order at one place (Diagrams not necessary) Each one carries Two Marks. 6 x 2 = 12M

ఈ క్రింది అన్ని ప్రశ్నలకు రెండు లేదా మూడు వాక్యాలలో ఒకే చోట సమాధానం వ్రాయుము. (వటములు అవసరం లేదు) ప్రతి దానికి రెండు మార్కులు.

17. Respiratory quotient	శ్వాసక్రియ కోషంట్
18. Nitrogenase	నైట్రోజినేజ్
19. Ethylene	ఎథిలీన్
20. Seed Viability	విత్తన అంకురణశక్తి
21. Olericulture	ఒలరీకల్చర్
22. Pruning	ప్రూనింగ్

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1. T. R. Reddy
2. B. S. Reddy
- 3.
- 4.
5. N. N. G. Vardhman.
6. V. L. Bhavanani
- 7.

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**BOTANY PRACTICAL – IV**

(Physiology, Tissue Culture, Biotechnology, Seed Technology and Horticulture)

**Physiology:**

**Major:**

1. Determination of osmotic potential of vacuolar sap by plasmolytic method using leaves of *Rhoeo* / *Tradescantia*.
2. Determination of rate of transpiration using cobalt chloride method/Ganong's photometer.
3. Separation of chloroplast pigments using paper chromatography technique.
4. Effect of temperature on membrane integrity by using Beetroot slices

**Minor:**

5. Osmosis-potato osmoscope experiment
6. Effect of CO<sub>2</sub> concentration on photosynthesis
7. Phototropism-Arc auxanometer experiment

**Tissue Culture, Biotechnology:**

1. Knowledge of instruments and facilities used in plant tissue culture using photographs.
2. Study of photographs-Isolation of nuclear and plasmid DNA and separation of DNA by Electrophoresis.
3. Synthetic seeds.
4. Study of Biopesticidal activity of leaf extracts of Annona /Neem /Lantana.

**Seed Technology and Horticulture**

1. Seed testing for moisture
2. Test for germination
3. Tetrazolium test
4. Experimental studies on vegetative propagation by stem cuttings (*Dracaena*/*Duranta* /*Acalypha*)
5. Study visits to places of horticultural and biotechnological interest – Commercial nurseries/ Botanical gardens; Biotechnology R & D Laboratories/Industries.

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1 T Rm  
2 Bh S  
3

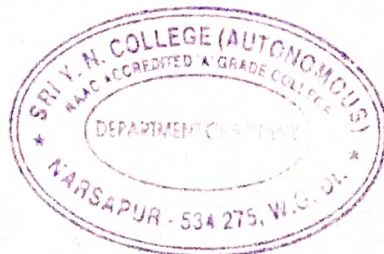
3

4

5 N. Nagavardhanam

6 V.L. Bhanani

7



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**BOTANY PRACTICAL IV- AT THE END OF FIFTH SEMESTER**

---

**TIME: 1½ Hrs**

**MARKS: 20**

I Describe the experiment 'A' from Physiology.

10M

II Describe the experiment 'B'

10M

Synthetic Seeds / Biopesticidal activity

---

**BOTANY PRACTICAL IV- AT THE END OF SIXTH SEMESTER**

---

**TIME: 1½ Hrs**

**MARKS: 20**

I. Describe the experiment 'A' from Seed technology  
(moister test/ germination test/ tetrazolium)

10M

II. Describe the experiment 'B' from Horticulture  
( Veg propagation by stem cuttings)

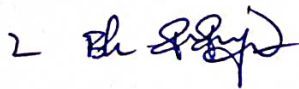
10M

  
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1 

2 

3

4

5 N. Naganavardhanam.

6 V. L. Bhevari

7

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**BOTANY PRACTICAL IV**

**(Physiology, Tissue Culture, Biotechnology, Seed Technology and Horticulture)**

Date:

Max. Marks: 75.

Time:

Duration :3hrs

1. Conduct the given physiology experiment 'A' and interpret the results. 12.  
Conduction procedure: 6 marks, Results: 3 marks, Diagram: 3 marks
2. Explain the physiology experiment 'B' with the help of a labeled diagram. 08.  
Explanation: 5 marks Diagram: 3 marks.
3. (Study of Biopesticidal activity of leaf extracts of Annona /Neem /Lantana) 10
4. Tissue Culture Instruments (Autoclave, Hot air oven, Laminar air flow) 05
5. DNA isolation technique./ Synthetic seeds  
Experimental procedure – 7 marks. Diagrams – 3marks. 10
6. Seed testing(Test for Moisture, Test for germination and Tetrazolium test) 05
7. Describe the process\_ of vegetative propagation by stem cuttings . 10  
(Dracaena /Duranta /Acalypha)
8. Certified Record, Field visit and viva 10+3+2=15.

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1 T. R. R.

2 M. S. S.

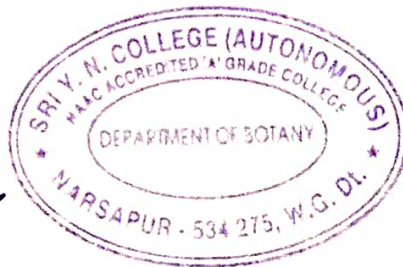
3

4

5 N. Nagarajdharam.

6 V. L. Bhavani

7



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BOTANY

PAPER III(A/B),IV(A/B)—MID-I/MID-II

Time : 1 Hrs

Max.Marks:20

Draw labelled diagram for question No.1 and 2, if necessary 10M



1. a).....

(or)

b).....

Write short notes on any two of the following

2x3=6M

2)

3)

4)

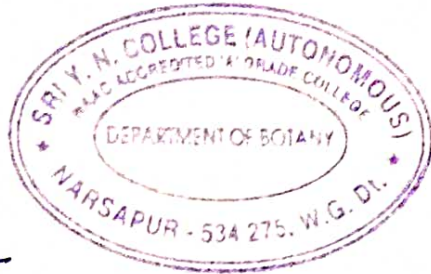
5)

Answer the following in two or three sentences

2x2=4M

6)

7)



*Thyagaraj*  
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1 *Thyagaraj*

2 *Bh. Raju*

3

4

5 *N. Nagavardhanam*

6 *V.L. Bhavani*

7