

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(Autonomous)

Re-Accredited by NAAC with "A" Grade)
(Affiliated to Mahatma Gandhi University)

BOARD OF STUDIES

SYLLABUS - 2015-16

NAGARJUNA GOVERNMENT COLLEGE
(Autonomous), NALGONDA
Re accredited by NAAC with 'A' Grade
DEPARTMENT OF BOTANY



BOTANY Syllabus
CBCS (Choice Based Credit System)

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(AUTONOMOUS, RE-ACCREDITED BY NAAC WITH "A" GRADE)

B.Sc I Year I SEMESTER SYLLABUS (2015-16)

Subject: Botany

Name of the Module: Microbial Diversity, Algae and Fungi

Nature of the Module: Core

Mode of the Learning: Regular

UNIT- I

Evolution of Life and Diversity of Microbes:

1. Origin and evolution of Life - an outline.

2. Viruses: Structure, replication and transmission; plant diseases caused by viruses and their control.

3. Bacteria: Structure, nutrition, reproduction and economic importance.

An outline of Plant diseases of important crop plants caused by bacteria and their control.

4. Brief account of Archaeobacteria, Chlamydia, Actinomycetes and Mycoplasma.

UNIT- II

Algae:

5. Algae: General account, thallus organisation, structure, reproduction, classification and economic importance.

6. Structure, reproduction, life history and systematic position of *Oedogonium*, *Coleochaete*, *Chara*.

UNIT-III

7. Structure, reproduction, life history and systematic position of *Ectocarpus* and *Polysiphonia*.

8. Cyanobacteria: Cell structure, thallus organisation and their prospecting (uses)-Biofertilizers. Structure and life history of *Oscillatoria*, *Nostoc* and *Anabaena*.

UNIT-IV

Fungi:

9. Fungi: General characters, classification and economic importance.

10. Structure, reproduction and life history of *Albugo*, *Saccharomyces*, *Penicillium*, *Puccinia*, *Alternaria*,. General account of plant diseases caused by Fungi and their control.

11. Lichens: Structure and reproduction; ecological and economic importance.

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NAGARJUNA GOVERNMENT COLLEGE (AUTONOMOUS) NALGONDA.

MODEL QUESTION PAPER

B. Sc I Yr, I Semester-End examination

BOTANY (Paper-I)

(Module: Diversity of Microbes, Algae & Fungi)

Time: 2 ½ Hrs.

Max Marks: 70

Instructions to the candidates: Draw neat labeled diagrams wherever necessary.

SECTION-A

(5 X 2 = 10)

Define or explain ALL of the following :

1. Viroid
2. Tetra spores
3. Heterocysts
4. Classification of Penicillium
5. Guidukov phenomenon

SECTION-B

(Instructions to the question PAPER SETTER: Set at least ONE question from EACH UNIT of the given syllabus).

Write short answers for FOUR of the following:

(4 X 5 = 20)

6. Structure of TMV
7. Mycoplasma
8. Cell division in Oedogonium
9. Nostoc
10. Economic importance of Lichens
11. Alternaria

SECTION-C

(Instructions to the question PAPER SETTER: Set TWO questions from EACH UNIT of the given syllabus).

Write detailed answers for ALL of the following:

(4 X 10 = 40)

UNIT - I

12. (a) Describe the replication of bacteriophage DNA
(OR)
(b) Explain the ultra cell structure of Bacteria

UNIT - II

13. (a) Write about the economic importance of algae
(OR)
(b) Describe the life history of Chara

UNIT - III

14. (a) Describe the post fertilization changes lead to development of cystocarp in Polysiphonia
(OR)
(b) Describe the structure of cyanobacteria cell

UNIT - IV

15. (a) Write an account of the complete life history of Puccinia
(OR)
(b) Give an account of the sexual reproduction and fruit formation in Penicillium vermiculatum

Chara Kansar.

Alpady

S. K. Das

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(AUTONOMOUS, RE-ACCREDITED BY NAAC WITH "A" GRADE)

B.Sc I Year II SEMESTER SYLLABUS (2015-16)

Subject: **Botany**

Name of the Module: **Bryophyta, Pteridophyta, Gymnosperms & Palaeobotany**

Nature of the Module: **Core**

Mode of the Learning: **Regular**

UNIT-I

Bryophyta:

1. **Bryophytes:** General characters, classification and alternation of generations.
2. Structure, reproduction, life history and systematic position of *Marchantia*, *Anthoceros* and *Polytrichum*.
3. Evolution of Sporophyte in Bryophytes.

UNIT-II

Pteridophytes:

4. **Pteridophytes:** General characters, classification, alternation of generations and evolution of sporophyte.
5. Structure, reproduction, life history and systematic position of *Rhynia*, *Lycopodium*, *Equisetum* and *Marsilea*.
6. Evolution of stele, heterospory and seed habit in Pteridophytes.

UNIT-III

Gymnosperms and Palaeobotany:

7. **Gymnosperms:** General characters, structure, reproduction and classification.
8. Morphology of vegetative and reproductive parts, systemic position, life history of *Pinus* and *Gnetum*.

UNIT-IV

9. Distribution and economic importance; endangered Gymnosperms.
10. **Palaeobotany:** Introduction, Fossils and fossilization; Geological time scale; Importance of fossils.
11. Bennettitales: General account.

Rana Gansar

M. G. G. G.

S. V. K. S.

NAGARJUNA GOVERNMENT COLLEGE (AUTONOMOUS) NALGONDA.

MODEL QUESTION PAPER

B. Sc I Yr, II Semester-End examination

BOTANY (Paper-II)

(Module: Bryophyta, Pteridophyta, Gymnosperms & Palaeobotany)

Time: 2 ½ Hrs.

Max Marks: 70

Instructions to the candidates: Draw neat labeled diagrams wherever necessary.

SECTION-A

(5 X 2 = 10)

Define or explain ALL of the following :

1. Elaters
2. Haplostele
3. Pinus pollen grains
4. Gnetum ovule
5. Impressions

SECTION-B

(Instructions to the question PAPER SETTER: Set at least ONE question from EACH UNIT of the given syllabus).

Write short answers for FOUR of the following

(4 X 5 = 20)

6. Gemmae
7. Sporophyte of Polytrichum
8. Gametophyte of Lycopodium
9. Heterospory
10. General characters of Gymnosperms
11. Importance of fossils

SECTION-C

(Instructions to the question PAPER SETTER: Set TWO questions from EACH UNIT of the given syllabus).

Write detailed answers for ALL of the following:

(4 X 10 = 40)

UNIT - I

12. (a) Write an Essay on evolution of sporophyte in Bryophytes

(OR)

- (b) Give an account of sexual reproduction in Anthoceros

UNIT - II

13. (a) Give an account of Rhynia

(OR)

- (b) Describe the spore producing organs of Equisetum

UNIT - III

14. (a) Describe the internal structure of Pinus needle and point out its xerophytic characters

(OR)

- (b) Describe the development of male and female gametophyte of Gnetum

UNIT - IV

15. (a) Give an account of the general characters of Bennettitales

(OR)

- (b) What are fossils? Give an account of various types of fossils

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
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BOTANY

B.Sc I Year Practical Syllabus
Academic Year 2015-16

Paper – I

(Microbial Diversity, Cryptogams and Gymnosperms)
(Total Hours of Laboratory Exercises: 90 @ 3 h / Week in 30 Sessions)

Suggested Laboratory Exercises:

- 1 Knowledge of equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot air oven, Autoclave / Pressure cooker, Laminar air flow / Inoculation chamber, Incubator, etc. (3 h)
- 2 Preparation of solid and liquid media for culturing of microbes (Demonstration) (9 h)
- 3 Study of viruses and bacteria using electron micrographs (photographs). (3 h)
- 4 Gram-staining of Bacteria (3 h)
- 5 Study of symptoms of plant diseases caused by viruses and bacteria:
Viruses: Tobacco mosaic virus, Bunchy top of banana, Yellow vein clearing of bhendi, Leaf curl of papaya (3 h)
Bacteria: Citrus canker, Leaf blight of Rice, Angular leaf spot of cotton. (3 h)
6. Vegetative and reproductive structures of the following taxa:
Algae: *Oscillatoria*, *Nostoc*, *Anabena*, *Volvox*, *Oedogonium*, *Coleochaete*, *Ectocarpus* and *Polysiphonia*. (6 h)
Fungi: *Albugo*, *Saccharomyces*, *Penicillium*, *Puccinia* and *Alternaria*. (6 h)
7. Section cutting of diseased material infected by Fungi and identification of pathogens as per theory syllabus. (6 h)
8. *Lichens:* Different types of thalli and their external morphology (3 h)
9. Morphology (vegetative and reproductive structures) and anatomy of the following taxa:
Bryophytes: *Marchantia*, *Anthoceros* and *Polytrichum*. (9 h)
Pteridophytes: *Lycopodium*, *Equisetum* and *Marsilea*. (12 h)
Gymnosperms: *Pinus* and *Gnetum*. (6 h)
10. Fossil forms using permanent slides / photographs: *Rhynia* and *Cycadeoidea* (3 h)
11. Symptoms of plant diseases caused by Fungi and mycoplasma: Tikka disease of Groundnut, Late blight of Potato, Ergot of Bajra, Whip smut of Sugarcane, Wheat rust, Brown spot of Rice, Rice (Paddy) blast, Head smut of Sorghum, Little leaf disease of Brinjal (3 h)
12. Enumeration and examination of important microbial, fungal and algal products: Biofertilizers, protein capsules, antibiotics, mushrooms, SCP, Agar-agar etc. (6 h)
13. Field visits to places of algal / microbial / fungal interest (e.g. Mushroom cultivation, water bodies) (6 h)

Rana Hansar.

W. S. S. S.

S. K. S. S.

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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Model Question Paper for B.Sc I Year Practical Examination

SUBJECT: - BOTANY

(Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms)

Time: 3 Hrs,

Max.Marks:50

- Q1. Identify the algae (ABCD) from the given mixture and draw labeled diagrams by giving important characters. $4 \times 3 = 12$
- Q2. Describe the procedure of bacterial staining and identify the given Bacterium.
Gram +Ve/Gram -Ve (E) $1 \times 4 = 04$
- Q3. Prepare temporary mount of the given diseased plant material. Identify and give the description of pathogen with the help of diagrams. (F) $1 \times 7 = 07$
- Q4. Prepare the section of the given material (Bryophyta, Pteridodophyta and Gymnosperms) by using single staining method, identification and description of the slide. (G) $1 \times 10 = 10$
- Q5. Identification and description of specimens and slides. (H, I, J, K) $4 \times 3 = 12$
- Q6. Record $1 \times 5 = 05$

Lana Kansar

W. J. J. J.

S. K. Reddy

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(AUTONOMOUS, RE-ACCREDITED BY NAAC WITH "A" GRADE)

B.Sc II Year III SEMESTER SYLLABUS (2015-16)

Subject: Botany

Name of the Module: Plant Anatomy and Embryology

Nature of the Module: Core

Mode of the Learning: Regular

UNIT – I

Plant Anatomy:

1. Introduction to Plant Anatomy
Meristems: Types, histological organization of shoot and root apices and theories.
2. *Tissues and Tissue Systems*:
(a) Simple tissues (b) Complex tissues (c) Special tissues (d) Ground tissue system
(e) Vascular tissue system and epidermal tissue system.
3. *Leaf*: Ontogeny, diversity of internal structure; stomata and epidermal outgrowths.

UNIT – II

4. Internal structure of stem and root, formation and functions of vascular cambium. Normal secondary growth of dicot stem.
5. Anomalous secondary growth of the following stems and root.
(a) Achyranthes (b) Boerhaavia (c) Dracaena (d) Bignonia (e) Beta root.
6. Wood Anatomy:- General account study of local timbers
(a) Teak (*Tectona grandis*)
(b) Rose wood (*Dalbergia latifolia*)
(c) Red sanders (*Pterocarpus santalinus*)
(d) Nallamaddi (*Terminalia tomentosa*)
(e) Yegisa (*Pterocarpus marsupium*)
(f) Neem (*Azadirachta indica*)

UNIT – III

Embryology:

7. (a) Introduction: History and importance of Embryology.
(b) Anther structure, Microsporogenesis and development of male gametophyte.
8. (c) Ovule structure and types; Megasporogenesis; types and development of female gametophyte.

UNIT- IV

9. Pollination - Types; Pollen - pistil interaction. Fertilization.
10. Endosperm - Development and types. Embryo - development and types; Polyembryony and Apomixis - an outline.
11. Palynology:- Pollen morphology (a) Hibiscus (b) Acacia (c) Grass, NPC System.

E. Anand

W. S. S. S.

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NAGARJUNA GOVERNMENT COLLEGE (AUTONOMOUS) NALGONDA.

MODEL QUESTION PAPER

B. Sc II Yr, III Semester-End examination

BOTANY (Paper-III)

(Plant Anatomy and Embryology)

Time: 2 ½ Hrs.

Max Marks: 70

Instructions to the candidates: Draw neat labeled diagrams wherever necessary.

SECTION-A

(5 X 2 = 10)

Define or explain ALL of the following :

1. Annual growth rings
2. Hydathodes
3. Orthotropous ovules
4. Hypostase
5. Endothelium

SECTION-B

(Instructions to the question PAPER SETTER: Set at least ONE question from EACH UNIT of the given syllabus).

Write short answers for FOUR of the following:

(4 X 5 = 20)

6. Tunica carpus theory
7. Collenchyma
8. Types of stomata
9. Helobial endosperm
10. Microsporogenesis
11. Pollination and its types

SECTION-C

(Instructions to the question PAPER SETTER: Set TWO questions from EACH UNIT of the given syllabus).

Write detailed answers for ALL of the following:

(4 X 10 = 40)

UNIT - I

12. (a) Write an essay on meristems

(OR)

- (b) Describe complex tissue in angiosperms

UNIT - II

13. (a) Describe the anomalous secondary growth of Achyranthus

(OR)

- (b) Explain the wood anatomy of Teak and Rose wood

UNIT - III

14. (a) Explain the T.S of anther

(OR)

- (b) Tetra sporic development in embryo sac

UNIT - IV

15. (a) Explain the fertilization process in angiosperms

(OR)

- (b) Describe dicot embryo development

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NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
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B.Sc II Year IV SEMESTER SYLLABUS (2015-16)

Subject: **Botany**

Name of the Module: **Taxonomy and Medicinal Botany**

Nature of the Module: **Core**

Mode of the Learning: **Regular**

UNIT – I

Taxonomy:

1. Introduction: Principles of plant systematics, Systematics vs Taxonomy, Types of classification: Artificial, Natural and Phylogenetic.
2. Systems of classification: Salient features and comparative account of Bentham & Hooker and Engler & Prantle. An introduction to Angiosperm Phylogeny Group (APG).
3. Current concepts in Angiosperm Taxonomy: Embryology in relation to taxonomy, Cytotaxonomy, Chemotaxonomy and Numerical Taxonomy.

UNIT- II

4. Nomenclature and Taxonomic resources: An introduction to ICBN, Vienna code - a brief account. Herbarium: Concept, techniques and applications.
5. Systematic study and economic importance of plants belonging to the following families.
(a) Annonaceae (b) Malvaceae (c) Rutaceae
Fabaceae ((d) Faboideae/papilionoideae, (e) Caesalpinioideae, (f) Mimosoideae),
(g) Cucurbitaceae (h) Apiaceae (i) Asteraceae
(j) Asclepiadaceae (k) Lamiaceae (l) Amaranthaceae
(m) Euphorbiaceae (n) Orchidaceae (o) Poaceae

UNIT – III

Medicinal Botany:

7. Ethnomedicine: Scope, inter disciplinary nature, distinction of ethnomedicine from folklore medicine. Outlines of Ayurveda, Sidda, Unani and Homeopathic system of traditional medicine. Role of AYUSH, NMPB, CIMAP and CDRI.
8. Plants in primary health care: Common medicinal plants – Tippateega (*Tinospora cordifolia*), tulasi (*Oscimum sanctum*), pippallu (*Piper longum*), Karaka (*Terminalia chebula*), Kalabanda (*Aloe vera*), Turmeric (*Curcuma longa*).

UNIT-IV

9. Traditional medicine 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 (*Rauwolfia serpentina*), Nela usiri (*Phyllanthus amarus*), Amla (*Phyllanthus emblica*) and Brahmi (*Bacopa monnieri*).
10. Pharmacognosy:- Introduction and scope Adulteration of Plant crude drugs and methods of identification – Some Examples. Indian pharmacopoeia.
11. Plant crude drugs: Types, Methods of collection, processing and storage practices, evaluation of crude drugs.

Lana Hanson

M. S. S. S.

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NAGARJUNA GOVERNMENT COLLEGE (AUTONOMOUS) NALGONDA.

MODEL QUESTION PAPER

B. Sc II Yr, IV Semester-End examination

BOTANY (Paper-IV)

(Taxonomy and Medicinal Botany)

Time: 2 ½ Hrs.

Max Marks: 70

Instructions to the candidates: Draw neat labeled diagrams wherever necessary.

SECTION-A

(5 X 2 = 10)

Define or explain ALL of the following :

1. ICBN
2. Artificial classification
3. AYUSH
4. Ethnomedicine
5. Ray floret floral formula

SECTION-B

(Instructions to the question PAPER SETTER: Set at least ONE question from EACH UNIT of the given syllabus).

Write short answers for FOUR of the following:

(4 X 5 = 20)

6. APG
7. Principles of plant systematics
8. Asclepiadaceae flower
9. Panchamahabutha's
10. Tulasi
11. Indian pharmacopeia

SECTION-C

(Instructions to the question PAPER SETTER: Set TWO questions from EACH UNIT of the given syllabus).

Write detailed answers for ALL of the following:

(4 X 10 = 40)

UNIT - I

12. (a) Explain embryology in relation to taxonomy

(OR)

(b) Compare Engler & Prantle classification with Bentham & Hooker's Classification

UNIT - II

13. (a) Family characters of Euphorbiaceae

(OR)

(b) Explain the family characters of Poaceae

UNIT - III

14. (a) Describe the various traditional systems of medicine

(OR)

(b) Give general account of Tippateega Karaka

UNIT - IV

15. (a) Describe active principles and pharmacological action of any two medicinal plants

(OR)

(b) Explain about adulteration of plant crude drugs

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[Signature]

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NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
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Model Question Paper for B.Sc II Year Practical Examination

SUBJECT: - BOTANY

(Anatomy, Embryology, Taxonomy and Medicinal Botany)

Max.Marks:50

Time: 3 Hrs.

- I. Section cutting and preparation of permanent slide by double staining method. (A)
1 x 8 = 08
- II. Prepare the temporary mount of epidermal peel from given leaf material and identify stomatal types. (B)
1 x 6 = 06
- III. Pollen viability test (C)
1 x 6 = 06
- IV. Description of vegetative and floral characters of given plant twigs 'D' and 'E' with floral formula and floral diagrams.
2 x 8 = 16
- V. Comment on spotters (F, G, H, I)
4 x 2 = 08
- VI. Record and Herbarium
4 + 2 = 06

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Rana Hansar.

Maddy

S. B. Reddy

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(AUTONOMOUS, RE-ACCREDITED BY NAAC WITH "A" GRADE)

BOTANY (Paper-V)

B. Sc III Year V SEMESTER SYLLABUS (2015-16)

(Cell Biology and Genetics)

UNIT - I

CELL BIOLOGY:

1. **Plant cell envelops:** Ultra structure of cell wall, molecular organization of cell membranes.
2. **Nucleus:** Ultra structure, nucleic acids, structure and replication of DNA, types and functions of RNA.

UNIT - II

3. **Chromosomes:** Morphology, organization of DNA in a chromosome, euchromatin and heterochromatin, Karyotype.
4. **Special types of Chromosomes:** Lampbrush, Polytene and B-Chromosomes.
5. **Cell division:** cell cycle and its regulation; mitosis, meiosis and their significance.

UNIT - III

GENETICS:

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

UNIT - IV

8. **Mutations:** Chromosomal aberrations-structural and numerical changes; Gene mutations.
9. **Gene Expression:** Organization of gene, transcription, translation, mechanism and regulation of gene expression in prokaryotes (Lac-operon and Trp-operon \S).
10. **Extra nuclear genome:** Mitochondrial and plastid DNA, plasmids.

Rana Hansar.

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S. K. [Signature]

NAGARJUNA GOVERNMENT COLLEGE (AUTONOMOUS) NALGONDA.

MODEL QUESTION PAPER

B. Sc III Yr, V Semester-End examination

BOTANY (Paper- V)

(Cell Biology and Genetics)

Time: 2 ½ Hrs.

Max Marks: 40

SECTION – A

(Marks 4 x 8 = 32)

Answer all the questions; answer should not exceed 80 lines for each question. Draw well labeled diagrams; wherever necessary.

1. (a) Describe chemical composition and molecular models of plasma membrane.
(or)
(b) Explain structure and replication of DNA.
2. (a) Describe the special types of chromosomes.
(or)
(b) Write about meiosis and their significance.
3. (a) Explain the mechanism of crossing – over and its significance
(or)
(b) Describe gene interactions and write any four types of interactions.
4. (a) Write an essay about translation.
(or)
(b) Describe the Mechanism of Lac operon in prokaryote.

SECTION – B

(Marks 4 x 2 = 8)

Attempt any four questions; answer should not exceed 20 lines.

1. Histone proteins
2. Types of RNA
3. Heterochromatin
4. Diplotene stage
5. Law of independent assortment
6. Plastid DNA
7. Point mutation
8. Transcription

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NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
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BOTANY (Paper-VI)

B. Sc III Year V SEMESTER SYLLABUS (2015-16)
(Tissue culture, Biotechnology, Seed Technology and Horticulture)

UNIT - I

Tissue Culture & Biotechnology

1. **Tissue Culture:** Introduction, sterilization procedures, culture media composition and preparation; explants.
2. **Callus Cultures:** Cell and protoplast culture, somatic hybrids and cybrids.
3. **Applications of Tissue Culture:** Production of pathogen free plants and somaclonal variants, production of stress resistance plants, secondary metabolites and synthetic seeds.

UNIT - II

4. **Biotechnology:** Introduction, history and scope.
5. **rDNA Technology:** Vectors and gene cloning and transgenic plants.

UNIT - III

Seed Technology and Horticulture

6. **Seed:** Structure and types. Seed dormancy, causes and methods of breaking dormancy.
7. **Seed Storage:** Seed banks, factors affecting seed viability, genetic erosion, seed production technology; seed testing and certification.
8. **Horticulture Technology:** Introduction, cultivation of ornamental and vegetable crops, Bonsai and landscaping.

UNIT - IV

9. **Floriculture:** Introduction. Importance of green house, polyhouse, mist chamber, shade nets; Micro irrigation systems. Floriculture potential and its trade in India
10. **Vegetative propagation of plants:** Stem, root and leaf cutting. Layering and Bud grafting, role of plant growth regulators in horticulture.

Rana Hansar.

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NAGARJUNA GOVERNMENT COLLEGE (AUTONOMOUS) NALGONDA.

MODEL QUESTION PAPER

B. Sc III Yr, V Semester-End examination

BOTANY (Paper- VI)

(Tissue culture, Biotechnology, Seed Technology and Horticulture)

Time: 2 ½ Hrs.

Max Marks: 40

SECTION – A

(Marks 4 x 8 = 32)

Answer all the questions; answer should not exceed 80 lines for each question. Draw well labeled diagrams; wherever necessary.

1. (a) Explain the various steps in tissue culture.
(or)
(b) Describe the somatic hybrids and cybrids and their importance.
2. (a) Write a general account of production of stress resistance plant.
(or)
(b) Write an essay about vectors, used in gene cloning.
3. (a) Write a general account of seed production technology..
(or)
(b) Describe the methods of development of Bonsai.
4. (a) Describe the Floriculture potential and its trade in India.
(or)
(b) Explain the layering and bud grafting methods in vegetative propagation.

SECTION – B

(Marks 4 x 2 = 8)

Attempt any four questions; answer should not exceed 20 lines.

1. Explants
2. Synthetic seeds
3. Transgenic plants
4. Restriction enzymes
5. Seed Banks
6. Land scaping
7. Green house
8. Role of IAA in Horticulture

Uma Kavasar.

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S. K. Reddy

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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BOTANY (Paper-VII)

B. Sc III Year VI SEMESTER SYLLABUS (2015-16)

(Ecology, Biodiversity and Conservation)

UNIT - I

Ecology:

1. **Ecosystem:** Concept and components of ecosystem, energy flow, food chains, food webs, ecological pyramids, biogeochemical cycles- Carbon, Nitrogen and Phosphorus.
2. **Plants and Environment:** Ecological factors – climatic (light and temperature), edaphic and biotic, ecological adaptations of plants.
3. **Population Ecology:** Natality, Mortality, Growth curves, ecotypes, ecads.

UNIT - II

4. **Community Ecology:** Frequency, density, cover, life forms, biological spectrum, ecological succession (Hydrosere, Xerosere).
5. **Production Ecology:** Concepts of productivity, GPP, NPP, CR (Community respiration) and secondary production, P/R ratio and ecosystems.

UNIT - III

Biodiversity and Conservation:

6. **Biodiversity:** Concepts, convention on biodiversity – Earth summit. Types of biodiversity.
7. Levels, threats and value of biodiversity.
8. **Hot spots of India** – Endemism, North Eastern Himalayas, Western Ghats.

UNIT - IV

9. **Agro-biodiversity:** Vavilov centers of crop plants.
10. Principles of conservation: IUCN threat-categories, RED data book - threatened & endangered plants of India. Role of organizations in the conservation of Biodiversity - IUCN, UNEP, WWF, NBPGR. .

Rana Gansar.

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NAGARJUNA GOVERNMENT COLLEGE (AUTONOMOUS) NALGONDA.

MODEL QUESTION PAPER

B. Sc III Yr, VI Semester-End examination

BOTANY (Paper- VII)

(Ecology, Biodiversity and Conservation)

Time: 2 ½ Hrs.

Max Marks: 40

SECTION – A

(Marks 4 x 8 = 32)

Answer all the questions; answer should not exceed 80 lines for each question. Draw well labeled diagrams; wherever necessary.

1. (a) Describe the various kinds of ecological pyramids.
(or)
(b) Write an essay about biogeochemical cycles.
2. (a) Explain the Raunkier life forms.
(or)
(b) Describe the ecological succession of xerosere.
3. (a) Define the biodiversity and explain the types of biodiversity.
(or)
(b) Write an account of hot spots of Western Ghats.
4. (a) Describe the vavilov centres of crop plants.
(or)
(b) Write an essay about threatened and endangered species of plant community.

SECTION – B

(Marks 4 x 2 = 8)

Attempt any four questions; answer should not exceed 20 lines.

1. Food Chain
2. Ecotypes
3. Biological Spectrum
4. GPP, NPP
5. Earth Summit
6. Endemism
7. Red data book
8. Threatened species

Rama Hansar.

W. J. J. J.

S. K. Reddy

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
(AUTONOMOUS, RE-ACCREDITED BY NAAC WITH "A" GRADE)

BOTANY (Paper-VIII)

B. Sc III Year VI SEMESTER SYLLABUS (2015-16)

(Plant Physiology)

UNIT - I

1. **Water Relations:** Importance of water to plant life, physical properties of water diffusion, imbibition, osmosis, water, osmotic and pressure potentials, absorption, and transport of water, ascent of sap; transpiration; Stomatal structure and movements..
2. **Mineral Nutrition:** Essential macro and micro mineral nutrients and their role; symptoms of mineral deficiency; absorption of mineral ions; passive and active processes.
3. **Enzymes:** Nomenclature, characteristics, mechanism and regulation of enzyme action, enzyme kinetics, factors regulating enzyme action.

UNIT - II

4. **Photosynthesis:** Photosynthesis pigments, absorption and action spectra; Red drop and Emerson enhancement effect; concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation; Carbon assimilation pathways; C₃, C₄ and CAM; photorespiration.
5. **Translocation of organic substances:** Mechanism of phloem transport; source-sink relationships.

UNIT - III

6. **Respiration:** Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, pentose phosphate pathway.
7. **Nitrogen Metabolism:** Biological nitrogen fixation, nitrate reduction, ammonia assimilation, amino acid synthesis and protein synthesis.

UNIT - IV

8. **Growth and Development:** Definition, phases and kinetics of growth, physiological effects of phytochromes- auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids.
9. Physiology of flowering and photoperiodism, role of phytochromes in flowering.

Rana Kansar.

Reddy

S. K. Reddy

NAGARJUNA GOVERNMENT COLLEGE (AUTONOMOUS) NALGONDA.

MODEL QUESTION PAPER

B. Sc III Yr, VI Semester-End examination

BOTANY (Paper- VIII)

(Plant Physiology)

Time: 2 ½ Hrs.

Max Marks: 40

SECTION – A

(Marks 4 x 8 = 32)

Answer all the questions; answer should not exceed 80 lines for each question. Draw well labeled diagrams; wherever necessary.

1. (a) Explain the various components of water potential.
(or)
(b) Describe in detail about diffusion and imbibition.
2. (a) Write an account of cyclic and Non-cyclic electron transport in photosynthesis.
(or)
(b) Describe the C₄ pathway and compare it with C₃ pathway.
3. (a) Explain the mechanism of electron transport system of aerobic respiration.
(or)
(b) Describe the mechanism of protein synthesis.
4. (a) Explain the physiological effects of Auxins and Gibberellins.
(or)
(b) Describe the role of phytochromes in flowering.

SECTION – B

(Marks 4 x 2 = 8)

Attempt any four questions; answer should not exceed 20 lines.

1. Osmosis
2. Enzyme turnover number
3. Arnon's principle
4. Emerson enhancement effect
5. Fermentation
6. Dinitrogenase
7. Triple response growth
8. Photoperiodism

Rana Hansar.

W. L. D. D. D.

S. K. D. S. D.

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(AUTONOMOUS, RE-ACCREDITED BY NAAC WITH "A" GRADE)

BOTANY

B.Sc III Year Practical Syllabus for VI Semester

Academic Year 2015-16

Paper – III (V & VII)

(Cell Biology, Genetics & Ecology)

1. Demonstration of cytochemical methods: Fixation of plant material and nuclear staining.
2. Study of various stages of mitosis using cytological preparation of Onion root tips.
3. Study of various stages of meiosis using cytological preparation of Onion root flower buds.
4. Karyotype study using cytological preparation of dividing root tip cells of Onion/photographs/permanent slides.
5. Solving genetic problems related to monohybrid, dihybrid ratio and interaction of genes (minimum of six problems in each topic)
6. Construction of linkage maps; two point test cross.
7. Knowledge of ecological instruments: Working principles and applications of Hygrometer, rain guaze, anemometer, altimeter, light meter, wet and dry bulb thermometer (with the help of Equipment/diagrams/photographs).
8. Determination of soil texture (composition of clay, sand silt etc.) and pH.
9. Study of morphological and anatomical characteristics of plant communities using locally available plant species; Hydrophytes (Eichhornia, Hidrilla, Pistia, Nymphaea, Vallisneria); Xerophytes (Asparagus, Opuntia, Euphorbia antiquorum), Halophytes (Rhizophora, Avecenia).
10. Detailed study on macro flora of a local fresh water body.
11. Estimation of carbonates and bicarbonates in the given sample.
12. Minimum of two field visits to local areas of ecological/Conservation of biodiversity importance (Sacred grove/Reserved forest/Botanical garden/Zoo Park/Lake etc).

Rana Hansar

[Signature]

S. K. Desai

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(AUTONOMOUS, RE-ACCREDITED BY NAAC WITH "A" GRADE)

Model Question Paper for B.Sc III Year Practical Examination

SUBJECT: - BOTANY

(Cell Biology, Genetics & Ecology)

Time: 3 Hrs

Max.Marks:50

Note: Answer all questions. Draw well labeled diagrams; wherever necessary.

- I. Carry out the cytological preparation and staining of the given material and report and any TWO stages of cell division to the Examiners (A).
(Procedure -3marks + Slidepreparation-6marks+Diagram-3 marks+ Inference -3 marks}. 15 M
- II. Solve the TWO given Genetics problems: (B,C).
(Working out-3marks+inference-2marks, each problem-5marks) 2x5=10 M
- III. Ecology: Carry out analysis of the water sample and estimate the amount of (D).
(Analysis-3marks+Results and inference-2marks) 05 M
- IV. Critical notes on (FIVE) spotters of scientific interest: (E, F. G. H. I).
(Identification-1mark+Notes-1mark for each spotter-2marks) 5x2=10 M
- V. Viva- Voce (Interactive testing) 05 M
- VI. Record(s) and submissions. 05 M

* * *

Rana Hansar.

W. J. J.

S. K. Reddy

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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BOTANY

B.Sc III Year Practical Syllabus for VI Semester

Academic Year 2015-16

Paper – IV (VI & VIII)

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

1. Determination of osmotic potential of vacuolar sap by plasmolytic method using leaves of Rheo/Tradescantia.
2. Determination of rate of transpiration using cobalt chloride method.
3. Determination of stomatal frequency using leaf epidermal peelings/impressions.
4. Determination of catalase activity using potato tubers by titration method.
5. Separation of chloroplast pigments using paper chromatography technique.
6. Estimation of protein by biuret method.
7. Isolation and estimation of DNA.
8. Testing of seed viability using 2,3,5-triphenyl tetrazolium chloride (TTC).
9. Demonstration of seed dressing using fungicide to control diseases.
10. Demonstration of seed dressing using biofertilizer (Rhizobium) to enrich nutrient supply.
11. Study on tools/equipment used in horticulture: Rake, hoe, spade, trowel, digger, pick-axe, shade net, glass house and mist chamber.
12. Demonstration of vegetative plant propagation: Rooting of cuttings – Leaf and Stem; layering; stem, bud and wedge grafting.
13. Study on the application of plant growth regulator (IBA) for rooting of cuttings using ornamental plants.
14. Knowledge of instruments and facilities used in plant tissue culture using equipment/photographs. Preparation of plant tissue culture medium.
15. Demonstration of micro propagation using explants like axillary buds and shoot meristems (inoculation of explants).
16. Study of biotechnology products: Samples of antibiotics, vaccines, biofertilizers, single cell protein, cosmetics; photographs of transgenic plants, multiple shoots and Artificial/synthetic seeds.
17. Study visits to places of horticultural and biotechnological interest Commercial nurseries/Botanical gardens; Biotechnology R&D laboratories/Industries.

Rana Kansar.

Reddy

S. K. Reddy

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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Model Question Paper for B.Sc III Year Practical Examination

SUBJECT: - BOTANY

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

Time: 3 Hrs

Max.Marks:50

Note: Answer all questions. Draw well labeled diagrams; wherever necessary.

I. Conduct the Physiology experiment allotted to you. Give procedure, results and inference. (A)

(Procedure-3marks+Experimentation-6marks+observations-3marks+inference-3marks)

15 M

II. Conduct the biotechnological experiment allotted to you and write the procedure. (B)
(Preparation-5 marks+Identification-3 marks+Discussion-2 marks)

10 M

III. Describe the given horticultural procedure. (C)

(Observation-2marks+Identification-1mark+analysis-2marks)

05 M

IV. Critical notes on (FIVE) spotters. (D, E, F, G, H)

(Identification-1mark+Notes-1 mark for each spotter)

5x2=10 M

V. Viva – Voce

05 M

VI. Record(s)

05 M

* * *

Rama Kansar

Agddy

S.K. Lasy