

**NALANDA OPEN UNIVERSITY**  
**M.Sc. Botany, Part-I**  
**PAPER-I**  
(Biodiversity of Plant and Diversity of Algae)  
*Annual Examination, 2022*

**Time : 3 Hours.**

**Full Marks : 80**

*Answer Five Questions in all, selecting at least Two Questions from each group.  
All questions carry equal marks.*

**GROUP 'A'**

1. Describe Ecosystem. What are its components ?
2. What are important attributes made at global level to conserve Biodiversity ?
3. Describe different methods for calculation of productivity in a ecosystem.
4. Describe important Biodiversity zones of India.
5. Write short notes on any **Two** of the following:-
  - (a) Species diversity
  - (b) Benefits of Biodiversity
  - (c) Ecological Biodiversity
  - (d) Food Chain

**GROUP 'B'**

6. Describe in detail economic importance of algae.
7. Describe ultrastructure of Cyanophycean cell.
8. How different group of Algae are Classified on the basis of pigments ? What are their types.
9. Write short notes on any **Four** of the following:-
  - (a) Role of *Nostoc* as Nitrogen fixer
  - (b) Mancrandrous species of Oedogonium
  - (c) Akinete
  - (d) Aplanospore
  - (e) Parasitic algae
  - (f) See weeds
  - (g) Symbiotic Algae
10. What is Isomorphic alternation of generation ? Explain in context to life cycle of *Ectocarpus*.

\* \* \*

**EXAMINATION PROGRAMME-2022**  
**M.Sc. Botany, Part-I**

Date	Papers	Time	Examination Centre
10.11.2022	Paper-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
12.11.2022	Paper-II	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
15.11.2022	Paper-III	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
17.11.2022	Paper-IV	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
19.11.2022	Paper-V	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
22.11.2022	Paper-VI	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
24.11.2022	Paper-VII	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
26.11.2022	Paper-VIII	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna

**NALANDA OPEN UNIVERSITY**

**M.Sc. Botany, Part-I  
PAPER-II**

(Microbiology and Diversity of Fungi)  
*Annual Examination, 2022*

**Time : 3 Hours.**

**Full Marks : 80**

*Answer Five Questions in all, selecting at least Two Questions from each group.  
All questions carry equal marks.*

**GROUP 'A'**

1. Describe the ultra structure of Bacteriophage. How do they replicate in a Bacterial cell ?
2. Describe role of Bacteria in Industries.
3. Describe ultrastructure of a Bacterial cell. Give an account of chemistry of cell wall of Bacterial cell in detail.
4. Write short notes on any **two** of the following:-
  - (a) Binary fission
  - (b) Contribution of Louis Pasteur in Microbiology
  - (c) Role of Rhizobium in Nitrogen fixation
  - (d) Virion and Prion
5. Write short notes on any **two** of the following:-
  - (a) Kochs postulate
  - (b) Contribution of Alexander flaming in Microbiology
  - (c) Conjugation in Bacteria
  - (d) Antibiotics produced by Bacteria

**GROUP 'B'**

6. Describe method for cultivation of edible Mushrooms.
7. Give an account of Para sexuality in Fungi. What is its significance.
8. Describe in step wise manner method for cultivation of Mushroom on commercial basis.
9. Describe life cycle of Fungus causing Rust of Wheat. How this fungus does reoccurs on the plain of India every year.
10. Write short notes on any **two** of the following:-
  - (a) Life cycle of *Erysiphe*
  - (b) Fungi in Industries
  - (c) Life cycle of Albugo (Diagrammatic)
  - (d) Life Cycle of any Smut Disease

\* \* \*

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-I

### PAPER—III

(Plant Pathology)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. What do you understand by the term resistance for a disease in Plants. Describe different kinds of disease resistance found in plants.
2. Explain about any one of the following :—  
(a) Structural defense in the host plant to evade pathogen.  
(b) Chemical defense in the host plant during pathogenesis.
3. Give an account of Biological control of plant diseases. How can soil borne diseases can be controlled.
4. Describe symptoms, etiology, disease cycle and control measures for Powdery mildew ?
5. Describe various types of disease symptoms caused in host plant due to fungal infection.
6. Describe symptoms, etiology, disease cycle and control measures for Late blight of Potato.
7. Write short notes on any **Two** of the following :—  
(a) Red Rot of Sugarcane  
(b) White rust of Crucifers  
(c) Little leaf of Brinjal  
(d) Die back of Chilli
8. Write short notes on any **Two** of the following :—  
(a) Phytoalexins  
(b) Epidemic disease  
(c) Crop Rotation  
(d) Robert Koch and his postulates
9. What is plant quarantine ? How quarantine regulation can help in disease control.
10. Write short notes on :—  
(a) Nematodes  
(b) Hypertrophy & Hyperplasia  
(c) Inoculum Potential  
(d) Disease caused by Cercospora

\* \* \*

## M.Sc. Botany, Part-I

Programme for Practical Counselling Classes and Annual Practical Examination, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

### Practical Counselling Class Programme

Enrollment No.	Batch	Date	Paper	Date	Paper	Time (Daily)
All Old Students	<b>B1</b>	28.11.2022	I to IV	29.11.2022	V to VIII	9.00 AM to 5.00 PM
210260001 to 210260070	<b>B2</b>	30.11.2022	I to IV	01.12.2022	V to VIII	9.00 AM to 5.00 PM
210260071 to 210260150	<b>B3</b>	08.12.2022	I to IV	09.12.2022	V to VIII	9.00 AM to 5.00 PM
210260151 to 210260230	<b>B4</b>	10.12.2022	I to IV	12.12.2022	V to VIII	9.00 AM to 5.00 PM
210260231 to 210260310	<b>B5</b>	17.12.2022	I to IV	19.12.2022	V to VIII	9.00 AM to 5.00 PM

### Practical Examination Programme

Date	Time							
	9.00 AM to 11.00 AM		11.00 AM to 01.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
02.12.2022	B1	I	B1	II	B2	I	B2	II
05.12.2022	B1	III	B1	IV	B2	III	B2	IV
06.12.2022	B1	V	B1	VI	B2	V	B2	VI
07.12.2022	B1	VII	B1	VIII	B2	VII	B2	VIII
13.12.2022	B3	I	B3	II	B4	I	B4	II
14.12.2022	B3	III	B3	IV	B4	III	B4	IV
15.12.2022	B3	V	B3	VI	B4	V	B4	VI
16.12.2022	B3	VII	B3	VIII	B4	VII	B4	VIII
20.12.2022	B5	I	B5	II	B5	III	—	
21.12.2022	B5	IV	B5	V	B5	VI		
22.12.2022	B5	VII	B5	VIII	—	—		

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-I

### PAPER-IV

(Biology and diversity of Bryophyta and Pteridophyta)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer Five Questions in all, selecting at least Two Questions from each group.

All questions carry equal marks.

#### GROUP 'A'

- Mention the range of thallus structure in Hepaticopsida.
- Give an account of structure and reproduction of *Takakia*.
- Classify Bryophytes up to order level. Mention important characters.
- Describe sporophyte of *Marchantia* and compare it with sporophyte of *Anthoceros*.
- Write short notes on any **Two** of the following:-
  - Moss capsule
  - Sporophyte of sphagnum
  - International structure of thallus of *Riccia* and *Anthoceros*
  - Elaters and its significance

#### GROUP 'B'

- Discuss the importance of heterospory in the origin and evolution of seed habit.
- Describe the life cycle of *Equisetum*. Mention its phylogeny.
- What is Stele ? Describe different types of stele found in Pteridophytes. How siphonostele originates from Protostele.
- Describe the salient features of the life of a member of Filicales.
- Write short notes on any **Two** of the following:-
 

(a) Morphological nature of spike of <i>Ophioglossum</i>	(b) Cone of <i>Equisetum</i>
(c) Cone of <i>Calamites</i>	(d) Types of sorus in ferns

\* \* \*

### M.Sc. BOTANY, PART-I

Practical Counselling Classes and Practical Examination Programme, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### Practical Counselling Class Programme

Enrollment No.	Batch	Date	Paper	Date	Paper	Time (Daily)
All Old Students	<b>B1</b>	28.11.2022	I to IV	29.11.2022	V to VIII	9.00 AM to 5.00 PM
210260001 to 210260070	<b>B2</b>	30.11.2022	I to IV	01.12.2022	V to VIII	9.00 AM to 5.00 PM
210260071 to 210260150	<b>B3</b>	08.12.2022	I to IV	09.12.2022	V to VIII	9.00 AM to 5.00 PM
210260151 to 210260230	<b>B4</b>	10.12.2022	I to IV	12.12.2022	V to VIII	9.00 AM to 5.00 PM
210260231 to 210260310	<b>B5</b>	17.12.2022	I to IV	19.12.2022	V to VIII	9.00 AM to 5.00 PM

#### Practical Examination Programme

Date	Time							
	9.00 AM to 11.00 AM		11.00 AM to 01.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
02.12.2022	B1	I	B1	II	B2	I	B2	II
05.12.2022	B1	III	B1	IV	B2	III	B2	IV
06.12.2022	B1	V	B1	VI	B2	V	B2	VI
07.12.2022	B1	VII	B1	VIII	B2	VII	B2	VIII
13.12.2022	B3	I	B3	II	B4	I	B4	II
14.12.2022	B3	III	B3	IV	B4	III	B4	IV
15.12.2022	B3	V	B3	VI	B4	V	B4	VI
16.12.2022	B3	VII	B3	VIII	B4	VII	B4	VIII
20.12.2022	B5	I	B5	II	B5	III	—	
21.12.2022	B5	IV	B5	V	B5	VI		
22.12.2022	B5	VII	B5	VIII	—	—		

**NALANDA OPEN UNIVERSITY**  
**M.Sc. Botany, Part-I**  
**PAPER-V**  
(Diversity of Seed plants and their taxonomy)  
*Annual Examination, 2022*

**Time : 3 Hours.**

**Full Marks : 80**

*Answer Five Questions in all, selecting at least Two Questions from each group.  
All questions carry equal marks.*

**GROUP 'A'**

1. Describe the general characters of order *Ginkgoales*. Also mention its Phylogenetic significance.
2. Mention briefly the angiospermic feature found in *Gnetum*.
3. Trace the development of male gametophyte of *Pinus* or *Taxus*.
4. Write short notes on :-  
(a) Geological time period (b) Distribution of Gnetales in India
5. Write short notes on the following :-  
(a) Female cone of *Pinus* (b) Angiospermic feature of *Gnetum*

**GROUP 'B'**

6. Describe the salient feature of taxonomic classification of *Takhtajan*.
7. Describe the floral characters of family *Magnoliaceae*.
8. Describe in detail family *Acanthaceae* or *Papilionaceae*.
9. Write short notes on any **Two** of the following :-  
(a) Natural system and artificial system (b) Homology and Homoplasy  
(c) Taxometrics (d) Placentation
10. Write short notes on any **Two** of the following :-  
(a) ICBN (b) Chemotaxonomy  
(c) Types of Placentation (d) Modern basis of classification

\* \* \*

**M.Sc. BOTANY, PART-I**  
**Practical Counselling Classes and Practical Examination Programme, 2022**  
**Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna**

**Practical Counselling Class Programme**

<i>Enrollment No.</i>	<i>Batch</i>	<i>Date</i>	<i>Paper</i>	<i>Date</i>	<i>Paper</i>	<i>Time (Daily)</i>
All Old Students	<b>B1</b>	28.11.2022	I to IV	29.11.2022	V to VIII	9.00 AM to 5.00 PM
210260001 to 210260070	<b>B2</b>	30.11.2022	I to IV	01.12.2022	V to VIII	9.00 AM to 5.00 PM
210260071 to 210260150	<b>B3</b>	08.12.2022	I to IV	09.12.2022	V to VIII	9.00 AM to 5.00 PM
210260151 to 210260230	<b>B4</b>	10.12.2022	I to IV	12.12.2022	V to VIII	9.00 AM to 5.00 PM
210260231 to 210260310	<b>B5</b>	17.12.2022	I to IV	19.12.2022	V to VIII	9.00 AM to 5.00 PM

**Practical Examination Programme**

<i>Date</i>	<b>Time</b>							
	<b>9.00 AM to 11.00 AM</b>		<b>11.00 AM to 01.00 PM</b>		<b>1.30 PM to 3.30 PM</b>		<b>3.30 PM to 5.30 PM</b>	
	<i>Batch</i>	<i>Paper</i>	<i>Batch</i>	<i>Paper</i>	<i>Batch</i>	<i>Paper</i>	<i>Batch</i>	<i>Paper</i>
02.12.2022	B1	I	B1	II	B2	I	B2	II
05.12.2022	B1	III	B1	IV	B2	III	B2	IV
06.12.2022	B1	V	B1	VI	B2	V	B2	VI
07.12.2022	B1	VII	B1	VIII	B2	VII	B2	VIII
13.12.2022	B3	I	B3	II	B4	I	B4	II
14.12.2022	B3	III	B3	IV	B4	III	B4	IV
15.12.2022	B3	V	B3	VI	B4	V	B4	VI
16.12.2022	B3	VII	B3	VIII	B4	VII	B4	VIII
20.12.2022	B5	I	B5	II	B5	III	—	
21.12.2022	B5	IV	B5	V	B5	VI		
22.12.2022	B5	VII	B5	VIII	—	—		

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-I PAPER-VI

(Management of Forest Resources)  
Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

- Describe the causes of decline of forest and also mention its conservation.
- Give an account of vegetative propagation of forest plants.
- What is pulp and paper ? Describe the process of making of paper.
- Explain different task of Forest Management ?
- What is social forestry ? Describe importance and utility of social forestry.
- How Lac is obtained on commercial basis ? Mention its uses ?
- Give an account of Forest Ecosystem. Mention its important component.
- How the principle of Tissue culture can be applied to tree species.
- Write notes on any **Four** of the following:-
  - MAB programme
  - Pyramid of Biomass
  - Significance of annual ring
  - Protoplast fusion
  - Grading of timber
  - Two important timber yielding plant
- How gums, Resins and essential oil is procured from forest resource. Explain.

\* \* \*

### M.Sc. BOTANY, PART-I

Practical Counselling Classes and Practical Examination Programme, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### Practical Counselling Class Programme

Enrollment No.	Batch	Date	Paper	Date	Paper	Time (Daily)
All Old Students	<b>B1</b>	28.11.2022	I to IV	29.11.2022	V to VIII	9.00 AM to 5.00 PM
210260001 to 210260070	<b>B2</b>	30.11.2022	I to IV	01.12.2022	V to VIII	9.00 AM to 5.00 PM
210260071 to 210260150	<b>B3</b>	08.12.2022	I to IV	09.12.2022	V to VIII	9.00 AM to 5.00 PM
210260151 to 210260230	<b>B4</b>	10.12.2022	I to IV	12.12.2022	V to VIII	9.00 AM to 5.00 PM
210260231 to 210260310	<b>B5</b>	17.12.2022	I to IV	19.12.2022	V to VIII	9.00 AM to 5.00 PM

#### Practical Examination Programme

Date	Time							
	9.00 AM to 11.00 AM		11.00 AM to 01.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
02.12.2022	B1	I	B1	II	B2	I	B2	II
05.12.2022	B1	III	B1	IV	B2	III	B2	IV
06.12.2022	B1	V	B1	VI	B2	V	B2	VI
07.12.2022	B1	VII	B1	VIII	B2	VII	B2	VIII
13.12.2022	B3	I	B3	II	B4	I	B4	II
14.12.2022	B3	III	B3	IV	B4	III	B4	IV
15.12.2022	B3	V	B3	VI	B4	V	B4	VI
16.12.2022	B3	VII	B3	VIII	B4	VII	B4	VIII
20.12.2022	B5	I	B5	II	B5	III	—	
21.12.2022	B5	IV	B5	V	B5	VI		
22.12.2022	B5	VII	B5	VIII	—	—		

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-I

### PAPER-VII

(Cell Biology)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Give an account of ultrastructure of Mitochondria mention its specific function.
2. Explain origin and function of Golgi bodies.
3. What is cell cycle? Mention importance of each phase of cell cycle.
4. Describe how replication of DNA in angiosperm is Semi conservative.
5. Write short notes on any **Two** of the following :
  - (a) Chargaff rule
  - (b) Histone Proteins
  - (c) C-value paradox
  - (d) Apoptosis
6. Write short notes on any **Two** of the following :
  - (a) Transcription
  - (b) Termination codon and its significance
  - (c) Translation
  - (d) Translocation and its significance in Protein synthesis
7. Describe different types of RNA. Mention function of each types.
8. Write short notes on any **Two** of the following :
  - (a) Peroxisome
  - (b) Chemotherapy
  - (c) Structure of t RNA
  - (d) Structure of DNA
9. Explain Biochemical theory for origin of life.
10. Write short notes on any **Two** of the following :
  - (a) Nitrogenous base
  - (b) Structure and function of Nucleolus
  - (c) Viral Chromosome
  - (d) Z-DNA

\* \* \*

## M.Sc. BOTANY, PART-I

Practical Counselling Classes and Practical Examination Programme, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

### Practical Counselling Class Programme

Enrollment No.	Batch	Date	Paper	Date	Paper	Time (Daily)
All Old Students	<b>B1</b>	28.11.2022	I to IV	29.11.2022	V to VIII	9.00 AM to 5.00 PM
210260001 to 210260070	<b>B2</b>	30.11.2022	I to IV	01.12.2022	V to VIII	9.00 AM to 5.00 PM
210260071 to 210260150	<b>B3</b>	08.12.2022	I to IV	09.12.2022	V to VIII	9.00 AM to 5.00 PM
210260151 to 210260230	<b>B4</b>	10.12.2022	I to IV	12.12.2022	V to VIII	9.00 AM to 5.00 PM
210260231 to 210260310	<b>B5</b>	17.12.2022	I to IV	19.12.2022	V to VIII	9.00 AM to 5.00 PM

### Practical Examination Programme

Date	Time							
	9.00 AM to 11.00 AM		11.00 AM to 01.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
02.12.2022	B1	I	B1	II	B2	I	B2	II
05.12.2022	B1	III	B1	IV	B2	III	B2	IV
06.12.2022	B1	V	B1	VI	B2	V	B2	VI
07.12.2022	B1	VII	B1	VIII	B2	VII	B2	VIII
13.12.2022	B3	I	B3	II	B4	I	B4	II
14.12.2022	B3	III	B3	IV	B4	III	B4	IV
15.12.2022	B3	V	B3	VI	B4	V	B4	VI
16.12.2022	B3	VII	B3	VIII	B4	VII	B4	VIII
20.12.2022	B5	I	B5	II	B5	III	—	
21.12.2022	B5	IV	B5	V	B5	VI		
22.12.2022	B5	VII	B5	VIII	—	—		

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-I

### PAPER-VIII

(Plant Anatomy and Embryology)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer Five Questions in all, selecting at least Two Questions from each group.

All questions carry equal marks.

#### GROUP 'A'

1. Give an organization of root apical meristem. Explain with suitable sketch.
2. Write short notes on any **Two** of the following:
  - (a) Casparian strips
  - (b) Cambium and cork cambium
  - (c) Mechanical tissue
  - (d) Types of Phloem
3. Give an account of different types of vascular bundles found in angiosperm plant.
4. Classify stomata into its various types with suitable diagram, mentioning the significance of each type.
5. Write short notes on :
  - (a) Periderm
  - (b) Lenticels

#### GROUP 'B'

6. Describe pollen tube growth through Pistil leading to fertilization.
7. What are Endosperms ? Describe different types of Endosperms.
8. Describe double fertilization in angiosperms.
9. Describe in detail uses of Experimental Embryology.
10. Describe suitable protocol for development of haploid plant through anther culture.

\* \* \*

### M.Sc. BOTANY, PART-I

Practical Counselling Classes and Practical Examination Programme, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### Practical Counselling Class Programme

Enrollment No.	Batch	Date	Paper	Date	Paper	Time (Daily)
All Old Students	<b>B1</b>	28.11.2022	I to IV	29.11.2022	V to VIII	9.00 AM to 5.00 PM
210260001 to 210260070	<b>B2</b>	30.11.2022	I to IV	01.12.2022	V to VIII	9.00 AM to 5.00 PM
210260071 to 210260150	<b>B3</b>	08.12.2022	I to IV	09.12.2022	V to VIII	9.00 AM to 5.00 PM
210260151 to 210260230	<b>B4</b>	10.12.2022	I to IV	12.12.2022	V to VIII	9.00 AM to 5.00 PM
210260231 to 210260310	<b>B5</b>	17.12.2022	I to IV	19.12.2022	V to VIII	9.00 AM to 5.00 PM

#### Practical Examination Programme

Date	Time							
	9.00 AM to 11.00 AM		11.00 AM to 01.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
02.12.2022	B1	I	B1	II	B2	I	B2	II
05.12.2022	B1	III	B1	IV	B2	III	B2	IV
06.12.2022	B1	V	B1	VI	B2	V	B2	VI
07.12.2022	B1	VII	B1	VIII	B2	VII	B2	VIII
13.12.2022	B3	I	B3	II	B4	I	B4	II
14.12.2022	B3	III	B3	IV	B4	III	B4	IV
15.12.2022	B3	V	B3	VI	B4	V	B4	VI
16.12.2022	B3	VII	B3	VIII	B4	VII	B4	VIII
20.12.2022	B5	I	B5	II	B5	III	—	
21.12.2022	B5	IV	B5	V	B5	VI		
22.12.2022	B5	VII	B5	VIII	—	—		



# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-II

### PAPER-IX

(Plant Physiology and Biochemistry)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer Five Questions in all, selecting at least Two Questions from each group.

All questions carry equal marks.

#### GROUP 'A'

1. Describe Calvin Cycle for fixation of Carbon dioxide in Plants.
2. Describe biochemical principles involved in opening and closing of stomata.
3. Describe the role of Indole acetic acid in growth and development of plant.
4. Write short notes on any **two** of the following:-
  - (a) Vernalization
  - (b) Electron transport system
  - (c) Cytokinin and its role
  - (d) Diffusion pressure deficit
5. Write briefly about Biochemical Nitrogen fixation.

#### GROUP 'B'

6. What are properties of enzymes ? Describe mechanism of action of enzymes.
7. Describe different types of Vitamins. How are they synthesized (any one)
8. Define biomolecules and justify that carbohydrates are biomolecules.
9. Write short notes on any **two** of the following:-
  - (a) EMP
  - (b) Nitrification
  - (c) Transamination
  - (c) Chemical Structure of Chlorophyll
10. Write short notes on any **two** of the following :-
  - (a) Structure of DNA
  - (b) Structure of RNA
  - (c) Co enzymes
  - (d) Nitrification

\* \* \*

#### EXAMINATION PROGRAMME-2022

#### M.Sc. Physics, Chemistry, Botany, Zoology & Mathematics, Part-II

Date	Papers	Time	Examination Centre
27.01.2023	Paper-IX	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
31.01.2023	Paper-X	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
02.02.2023	Paper-XI	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
04.02.2023	Paper-XII	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
06.02.2023	Paper-XIII	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
08.02.2023	Paper-XIV	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
10.02.2023	Paper-XV	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
14.02.2023	Paper-XVI	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna

## M.Sc. Botany, Part-II

Programme for Practical Counselling Classes and Practical Examination, 2021

Venue : 1<sup>st</sup> Floor, Biscomaun Tower, Patna

### (A) Practical Counselling Classes Programme

<i>Enrollment No.</i>	<i>Batch</i>	<i>09.30 AM to 05.30 PM</i>			
		<i>Date</i>	<i>Paper</i>	<i>Date</i>	<i>Paper</i>
All Old Students & 190260001 to 190260045	<b>B1</b>	11-08-2022	IX - XII	13-08-2022	XIII - XVI
190260046 to 190260140	<b>B2</b>	20-08-2022	IX - XII	22-08-2022	XIII - XVI
190260141 to 190260300	<b>B3</b>	26-08-2022	IX - XII	27-08-2022	XIII - XVI

### (B) Practical Examination Programme

<i>Date</i>	<i>Batch</i>	<i>08 AM to 11 AM</i>	<i>11 AM to 02 PM</i>	<i>02.30 PM to 05.30 PM</i>
16-08-2022	B1	IX	X	XI
17-08-2022	B1	XII	XIII	XIV
18-08-2022	B1	XV	XVI	----
23-08-2022	B2	IX	X	XI
24-08-2022	B2	XII	XIII	XIV
25-08-2022	B2	XV	XVI	----
29-08-2022	B3	IX	X	XI
30-08-2022	B3	XII	XIII	XIV
31-08-2022	B3	XV	XVI	----

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-II

### PAPER-X

(Cytogenetics and Crop Improvement)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Describe two sex linked characters with suitable examples.
2. Give an account of structure and significance of B Chromosome.
3. What is genetic engineering ? Describe role of genetic engineering in Medicine or Agriculture.
4. What is Polyploidy ? Describe different types of Polyploidy also mention their role in crop improvements.
5. Write short notes on any **two** of the following :  
(a) Lamp brush chromosome (b) Sex linkage in Drosophila  
(c) Polytene chromosome (d) Nucleosome
6. Explain regulation of gene in Prokaryotes (Lactose operon).
7. Give an example to explain modification in mendelian Dihybrid ratio.
8. Write short notes on the following :-  
(a) Types of Chromosome banding Technique  
(b) Ionising and Non-Ionizing radiation.
9. Write short notes on:-  
(a) PCR technology to amplify DNA (b) Codominance
10. What do you mean by inversion. Explain pericentric and paracentric inversion.

\* \* \*

### M.Sc. Botany, Part-II

Programme for Practical Counselling Classes and Practical Examination, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### (A) Details of Batches

Enrollment No.	Batch
All Old Students & New 200260001 to 200260071	<b>B1</b>
200260072 to 200261200	<b>B2</b>

#### (B) Practical Counselling Class Programme

Date	Batch	Time (Daily)	Paper
11.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	IX to XII
12.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	XIII to XVI

#### (C) Practical Examination Programme

Date	Time							
	09.00 AM to 11.00 AM		11.00 AM to 1.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
15.02.2023	B1	IX	B1	X	B2	IX	B2	X
16.02.2023	B1	XI	B1	XII	B2	XI	B2	XII
17.02.2023	B1	XIII	B1	XIV	B2	XIII	B2	XIV
18.02.2023	B1	XV	B1	XVI	B2	XV	B2	XIV

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-II

### PAPER–XI

(Molecular Biology)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Explain the mechanism of DNA replication in prokaryotes with suitable diagram?
2. What are general properties of genetic code?
3. Describe different kinds of RNA and also mention their specific role.
4. What do you mean by splicing of RNA? Describe the process of pre-RNA splicing?
5. How DNA thread gets folded to form nucleosome? What is significance of nucleosome in packaging of DNA?
6. Write short notes on any **two** of the following:—
  - (a) Split genes
  - (b) Chargaff's rule of DNA equivalence
  - (c) Hydrogen bonding in DNA
  - (d) Nitrogenous bases
7. Write short notes on any **two** of the following:—
  - (a) Linker DNA
  - (b) Northern blotting
  - (c) Southern blotting
  - (d) Western blotting
8. What is the difference between polycistronic and monocistronic genes? What are their significance?
9. Explain tryptophan operon in prokaryotes.
10. Explain the chemical and physical structure of DNA.

\* \* \*

### M.Sc. Botany, Part–II

Programme for Practical Counselling Classes and Practical Examination, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### (A) Details of Batches

Enrollment No.	Batch
All Old Students & New 200260001 to 200260071	<b>B1</b>
200260072 to 200261200	<b>B2</b>

#### (B) Practical Counselling Class Programme

Date	Batch	Time (Daily)	Paper
11.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	IX to XII
12.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	XIII to XVI

#### (C) Practical Examination Programme

Date	Time							
	09.00 AM to 11.00 AM		11.00 AM to 1.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
15.02.2023	B1	IX	B1	X	B2	IX	B2	X
16.02.2023	B1	XI	B1	XII	B2	XI	B2	XII
17.02.2023	B1	XIII	B1	XIV	B2	XIII	B2	XIV
18.02.2023	B1	XV	B1	XVI	B2	XV	B2	XIV

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-II

### PAPER–XII

(Environmental Biology)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

- Describe different vegetational belts of India.
- What do you understand by the term sustainable development? Discuss various strategies formulated for sustainable development.
- What is biogeochemical cycle? Explain any one in detail.
- What is an ecosystem? Describe any one in detail.
- Explain, how human activities have caused major threat to biodiversity. Explain in a systematic manner.
- What is a succession? Describe succession in a pond.
- Write short notes on the following :  
(a) Green House effect (b) Acid Rain
- Write short notes on the following :  
(a) Food web (b) Radioactive Pollution
- Write short notes on the following :  
(a) Eutrophication (b) Red data book and its significance
- What do you understand by the term pollution? Give an account of water pollution. Mention its remedy.  
(a) World centre of Primary and Secondary diversity  
(b) Hot spots and their importance

\* \* \*

### M.Sc. Botany, Part–II

Programme for Practical Counselling Classes and Practical Examination, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### (A) Details of Batches

Enrollment No.	Batch
All Old Students & New 200260001 to 200260071	B1
200260072 to 200261200	B2

#### (B) Practical Counselling Class Programme

Date	Batch	Time (Daily)	Paper
11.02.2023	B1 and B2 (All Students)	09.00 AM to 5.30 PM	IX to XII
12.02.2023	B1 and B2 (All Students)	09.00 AM to 5.30 PM	XIII to XVI

#### (C) Practical Examination Programme

Date	Time							
	09.00 AM to 11.00 AM		11.00 AM to 1.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
15.02.2023	B1	IX	B1	X	B2	IX	B2	X
16.02.2023	B1	XI	B1	XII	B2	XI	B2	XII
17.02.2023	B1	XIII	B1	XIV	B2	XIII	B2	XIV
18.02.2023	B1	XV	B1	XVI	B2	XV	B2	XIV

**NALANDA OPEN UNIVERSITY**  
**M.Sc. Botany, Part-II**  
**PAPER–XIII**  
 (Plant Resources, Utilization and Conservation)  
*Annual Examination, 2022*

**Time : 3 Hours.**

**Full Marks : 80**

*Answer any Five Questions. All questions carry equal marks.*

1. Describe methods adopted in fusion of protoplast.
2. Describe cause of loss of biodiversity.
3. Write briefly the importance of in-situ and ex-situ conservation.
4. How somatic hybrid can be produced? Explain.
5. Write short notes on the following:
  - (a) Fiber yielding plant (also, list 5 such plants)
  - (b) Tiber yielding plant (also, list 5 such plants)
6. Write short notes on any **two** of the following:
  - (a) DBT
  - (b) ICAR
  - (c) CSIR
7. What do you mean by the term Green Revolution? Describe strategies adopted in Green Revolution.
8. Write short notes on any **two** of the following:
  - (a) Wet lands of Bihar
  - (b) Manufacture of paper from pulp
  - (c) Five medicinal plants
  - (d) Botanical survey of India and its importance
9. What is tissue culture? Describe protocol for tissue culture in plants.
10. Write short notes on the following:
  - (a) Skoog media for tissue culture
  - (b) Role of auxins in tissue culture.

\* \* \*

**M.Sc. Botany, Part-II**  
 Programme for Practical Counselling Classes and Practical Examination, 2022  
 Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

**(A) Details f Batches**

<i>Enrollment No.</i>	<i>Batch</i>
All Old Students & New 200260001 to 200260071	<b>B1</b>
200260072 to 200261200	<b>B2</b>

**(B) Practical Counselling Class Programme**

<i>Date</i>	<i>Batch</i>	<i>Time (Daily)</i>	<i>Paper</i>
11.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	IX to XII
12.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	XIII to XVI

**(C) Practical Examination Programme**

<i>Date</i>	<i>Time</i>							
	<b>09.00 AM to 11.00 AM</b>		<b>11.00 AM to 1.00 PM</b>		<b>1.30 PM to 3.30 PM</b>		<b>3.30 PM to 5.30 PM</b>	
	<i>Batch</i>	<i>Paper</i>	<i>Batch</i>	<i>Paper</i>	<i>Batch</i>	<i>Paper</i>	<i>Batch</i>	<i>Paper</i>
15.02.2023	B1	IX	B1	X	B2	IX	B2	X
16.02.2023	B1	XI	B1	XII	B2	XI	B2	XII
17.02.2023	B1	XIII	B1	XIV	B2	XIII	B2	XIV
18.02.2023	B1	XV	B1	XVI	B2	XV	B2	XIV

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-II

### PAPER–XIV

(Ethnobotany)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Give a brief account of future strategy of Ethnobotany.
2. Write short notes on the following:
  - (a) CITES
  - (b) IUCN
  - (c) Seed gene Bank
  - (d) Cryopreservation
3. What do you mean by aromatic plants? Write botanical name, family and importance of any five aromatic plants.
4. Give a brief account of any four of the drug yielding plants. Also mention their use in pharmaceutical industry.
5. Describe common spices and condiments found in India. Mention their importance.
6. What is germplasm? How can it be conserved?
7. Write short notes on any **two** of the following:
  - (a) Sarp Gandha
  - (b) Ashwagandha
  - (c) Aloe vera
  - (d) Tulsi
8. Name some plants used by ethnic people for:
  - (a) Making of musical instruments
  - (b) Making of agriculture implements
  - (c) Plants used for religious purpose
9. Write an essay on centers of Ethnobotany in India.
10. Describe any five fibre yielding plants with botanical name and family.

\* \* \*

#### M.Sc. Botany, Part-II

Programme for Practical Counselling Classes and Practical Examination, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### (A) Details of Batches

Enrollment No.	Batch
All Old Students & New 200260001 to 200260071	B1
200260072 to 200261200	B2

#### (B) Practical Counselling Class Programme

Date	Batch	Time (Daily)	Paper
11.02.2023	B1 and B2 (All Students)	09.00 AM to 5.30 PM	IX to XII
12.02.2023	B1 and B2 (All Students)	09.00 AM to 5.30 PM	XIII to XVI

#### (C) Practical Examination Programme

Date	Time							
	09.00 AM to 11.00 AM		11.00 AM to 1.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
15.02.2023	B1	IX	B1	X	B2	IX	B2	X
16.02.2023	B1	XI	B1	XII	B2	XI	B2	XII
17.02.2023	B1	XIII	B1	XIV	B2	XIII	B2	XIV
18.02.2023	B1	XV	B1	XVI	B2	XV	B2	XIV

# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-II

### PAPER–XV

(Aerobiology)

*Annual Examination, 2022*

**Time : 3 Hours.**

**Full Marks : 80**

*Answer any Five Questions. All questions carry equal marks.*

1. Describe in detail, structure of virus.
2. Describe post fertilization change leading to the formation of Ascospore in Fungi.
3. Eukaryotic cells differ from prokaryotic cells on what grounds? Describe.
4. Write an essay on aeromycoflora.
5. Write short notes on any **two** of the following:
  - (a) Various symptoms of Allergy
  - (b) Morphology of pollen
  - (c) Bacteria
  - (d) Nematodes
6. What do you mean by forecasting in aerobiology. How one can predict onset of disease on the basis of forecasting.
7. Write short notes on any **two** of the following:
  - (a) Air pollutants
  - (b) Immunity
  - (c) Soil pollutant
  - (d) Air Sampling methodologies
8. Explain the structure and morphology of fungal spores.
9. Explain sampling technique in detail.
10. Write the criteria for grouping organisms into five kingdoms. Describe main characters of each kingdom with example.

\* \* \*

#### M.Sc. Botany, Part–II

Programme for Practical Counselling Classes and Practical Examination, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### (A) Details of Batches

Enrollment No.	Batch
All Old Students & New 200260001 to 200260071	<b>B1</b>
200260072 to 200261200	<b>B2</b>

#### (B) Practical Counselling Class Programme

Date	Batch	Time (Daily)	Paper
11.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	IX to XII
12.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	XIII to XVI

#### (C) Practical Examination Programme

Date	Time							
	09.00 AM to 11.00 AM		11.00 AM to 1.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
15.02.2023	B1	IX	B1	X	B2	IX	B2	X
16.02.2023	B1	XI	B1	XII	B2	XI	B2	XII
17.02.2023	B1	XIII	B1	XIV	B2	XIII	B2	XIV
18.02.2023	B1	XV	B1	XVI	B2	XV	B2	XIV



# NALANDA OPEN UNIVERSITY

## M.Sc. Botany, Part-II

### PAPER–XVI

(Biotechnology and Bioinformatics)

Annual Examination, 2022

Time : 3 Hours.

Full Marks : 80

*Answer any Five Questions. All questions carry equal marks.*

1. What are T and B lymphocytes? Describe the role in immunity.
2. What is Polymerase Chain Reaction (PCR) ? Describe its application.
3. Fermentation is the basis of modern biotechnology. Discuss the statement.
4. Describe the role of vectors in recombinant DNA technology.
5. Give an account of DNA fingerprinting.
6. Write short notes on:
  - (a) CPU
  - (b) Byte
7. Write short notes on any **two** of the following:-
  - (a) DNA chips
  - (b) NCBI
  - (c) In situ conservation
  - (d) Ex situ conservation
8. Give an account of elementary knowledge of bioinformatics.
9. Write briefly:
  - (a) Protoplast isolation
  - (b) Agrobacterium plasmid
10. Describe the role of biotechnology in medicine and agriculture.

\* \* \*

#### M.Sc. Botany, Part-II

Programme for Practical Counselling Classes and Practical Examination, 2022

Venue : Botany Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna

#### (A) Details of Batches

Enrollment No.	Batch
All Old Students & New 200260001 to 200260071	<b>B1</b>
200260072 to 200261200	<b>B2</b>

#### (B) Practical Counselling Class Programme

Date	Batch	Time (Daily)	Paper
11.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	IX to XII
12.02.2023	<b>B1 and B2 (All Students)</b>	09.00 AM to 5.30 PM	XIII to XVI

#### (C) Practical Examination Programme

Date	Time							
	09.00 AM to 11.00 AM		11.00 AM to 1.00 PM		1.30 PM to 3.30 PM		3.30 PM to 5.30 PM	
	Batch	Paper	Batch	Paper	Batch	Paper	Batch	Paper
15.02.2023	B1	IX	B1	X	B2	IX	B2	X
16.02.2023	B1	XI	B1	XII	B2	XI	B2	XII
17.02.2023	B1	XIII	B1	XIV	B2	XIII	B2	XIV
18.02.2023	B1	XV	B1	XVI	B2	XV	B2	XIV