

NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-I
PAPER-I
(Biodiversity of Plant and Diversity of Algae)
Annual Examination, 2019

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. What do you understand by the term Biodiversity ? mention values of Biodiversity.
2. Describe different types of Bio-Geochemical cycle. Describe any one of them in detail. Mention its significance.
3. Describe important Biodiversity zones of India.
4. Write explanatory notes on any **Two** of the following :-
 - (a) Different trophic level with example
 - (b) Productivity
 - (c) Mutualism
 - (d) IUCN
5. Write short notes on any **Two** of the following :-
 - (a) Species diversity
 - (b) Benefits of Biodiversity
 - (c) Ecological Biodiversity

GROUP 'B'

6. Describe various mode of reproduction in Cyanophyceae.
7. Describe various types of vegetative reproduction in Chlorophyceae. What is their significance ?
8. Describe sexual reproduction in Phaeophyceae.
9. Describe the economic importance of Algae.
10. Write short notes on any **Four** of the following :-
 - (a) Algal bloom
 - (b) Agar-Agar its utilization and properties
 - (c) Symbiotic Algae
 - (d) Sea weeds
 - (e) Isomorphic alternation of generation
 - (f) Chanstransia stage

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M.Sc. Botany, Part-I
Programme for Practical Counselling Classes and Practical Examination, 2019
Venue : Zoology Lab, 1st Floor, Biscomaun Tower, Patna

Practical Counselling Class Programme

<i>Enrollment No.</i>	<i>Batch</i>	<i>Date</i>	<i>Paper</i>	<i>Time (Daily)</i>
All Old Students & 180260001 to 180260050	B1	27.06.2019 & 28.06.2019	I to VIII	10.00 AM to 5.00 PM
180260051 to 180260156	B2	29.06.2019 & 30.06.2019	I to VIII	10.00 AM to 5.00 PM

Practical Examination Programme

<i>Date</i>	Time					
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04.07.2019	B2	V	B2	VI	B1	VI
05.07.2019	B1	VII	B1	VIII	B2	VII
06.07.2019	B2	VIII	—	—	—	—

NALANDA OPEN UNIVERSITY

M.Sc. Botany, Part-I

PAPER-II

(Microbiology and Diversity of Fungi)

Annual Examination, 2019

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. Write an essay on Industrial importance of Bacteria.
3. What is Genetic recombination in Bacteria ? Describe Conjugation in bacteria.
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. Give an account of harmful role of microbes in nature.

GROUP 'B'

6. Write in detail about sexual reproduction in Fungi.
7. Describe in a step wise manner method for cultivation of Mushroom on commercial basis.
8. Describe life cycle of Fungus causing Rust of Wheat. How this fungus does reoccurs on the plain of India every year.
9. Write short notes on any **Two** of the following :-
 - (a) Sex hormones in Fungi and its significance
 - (b) Mycotoxins
 - (c) Apothecia
 - (d) Parasexuality
10. What is Heterothallism ? Describe heterothallism in fungi.

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M.Sc. Botany, Part-I

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NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-I
PAPER—III
 (Plant Pathology)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. How does fungal enzymes help in disease development. Explain in step-wise manner.
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. Discuss the role of toxins in disease development.
4. Give a brief account of Systemic fungicides.
5. Describe various types of disease symptoms caused in host plant due to fungal infection.
6. What do you mean by biological control of plant disease ? How disease can be controlled by microbes ?
7. Describe symptoms, etiology, disease cycle and control of Late blight of Potato or Early blight of potato.
8. Write short notes on any **Two** of the following :—
 - (a) Bordeaux mixture
 - (b) Antibiotic
 - (c) Soil amendment
 - (d) Disease forecasting System
9. Describe symptoms, etiology and control of Citrus Canker.
10. Describe symptoms mode of transmission and replication of Tobacco Mosaic Virus.

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NALANDA OPEN UNIVERSITY

M.Sc. Botany, Part-I

PAPER-IV

(Biology and diversity of Bryophyta and Pteridophyta)

Annual Examination, 2019

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'

- Describe the Salient features of Order Marchantiales. Mention its affinity.
- Give an account of Structure and reproduction of *Takakia*.
- Write short notes on any **Two** of the following :-
 - Moss capsule
 - Sporophyte of *sphagnum*
 - Internal Structure of thallus of *Riccia* and *Anthoceros*
 - Elaters and its significance
- Describe the sporophyte of *Anthoceros*. What light does it throw on evolution of land plant.
- Give an account of economic importance of Bryophyta.

GROUP 'B'

- Describe the origin of seed habit in context to members of Pteridophytes studied by you.
- Describe the life cycle of *Equisetum*. Mention its phylogeny
- Describe with example different types of stele found in Pteridophytes.
- Describe the structure and reproduction in *Rhynia*? What resemblance it shows to *Psilotum*.
- Write short notes on any **Two** of the following :-

(a) <i>Cyathea</i>	(b) Sporocorp of <i>Marsilea</i>
(c) Syngonium of <i>Psilotum</i>	(d) Protostele

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NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-I
PAPER-V
(Diversity of Seed plants and their taxonomy)
Annual Examination, 2019

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 account of Female gametophyte of *Pinus*.
2. Classify Gymnosperms upto the level of classes.
3. Give an account of Male gametophyte of *Taxus*.
4. Give an account of reproductive organs of *Williamsonia*.
5. Write short notes on any **Two** of the following :-
 - (a) Wood of *Pinus*
 - (b) Geological record of Gymnosperm
 - (c) Medicinal use of Gymnosperms
 - (d) Ovule of Bennettites

GROUP 'B'

6. Describe in detail Phylogeny of Magnoliaceae.
7. Write short notes on any **Two** of the following :-
 - (a) ICBN
 - (b) Cytotaxonomy
 - (c) α and β taxonomy
 - (d) Natural system of Classification
8. Describe system of classification as proposed by Cronquist or Takhtajan System of classification.
9. Describe in detail family Acanthaceae or Papilionaceae.
10. Write short notes on any **Two** of the following :-
 - (a) Cyathium inflorescence
 - (b) Verticillaster inflorescence
 - (c) Dichasial cyme with example
 - (d) Two important plants of Fabaceae

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M.Sc. Botany, Part-I

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NALANDA OPEN UNIVERSITY

M.Sc. Botany, Part-I

PAPER-VI

(Management of Forest Resources)

Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Describe the causes of decline of forest and also mention its conservation.
2. Give an account of vegetative propagation of forest plants.
3. Describe the drugs and spices obtained from the forest.
4. Explain the role of Agroforestry in India.
5. Give an account of Forest Ecosystem. Mention its important component.
6. Describe the main objectives of improvement of trees.
7. What are different methods of plantation in India.
8. How can a disease free plant be obtained through meristem culture ?
9. Write short notes on any **Two** of the following :—
 - (a) MAB Programme
 - (b) Shifting cultivation
 - (c) Mangrove forest
 - (d) Afforestation programme
10. Explain in detail the forest resources.

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M.Sc. Botany, Part-I

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NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-I
PAPER-VII
 (Cell Biology)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Describe the structure and function of Peroxisome. Mention its function.
2. Give an account of Ultrastructure of Mitochondria mention its specific function.
3. What is cell cycle ? Mention importance of each phase of cell cycle.
4. Describe in detail different stages of prophase I of meiosis. Describe significance of the phase.
5. Write short notes on any **Two** of the following :—
 - (a) Nucleosome
 - (b) Structure of Chromosome
 - (c) Types of viral genome
 - (d) Structure and function of Nucleolus
6. Give an experimental proof to support biochemical theory of origin of life.
7. Describe different types of RNA. Mention function of each types.
8. What do you mean by ecological amplitude under fresh water environment.
9. What is Senescence of a cell ? Describe the changes that occur during cell senescence.
10. Describe various steps involved in preparing a cytological slide for study of Chromosome in an eukaryotic cell.

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NALANDA OPEN UNIVERSITY

M.Sc. Botany, Part-I

PAPER-VIII

(Plant Anatomy and Embryology)

Annual Examination, 2019

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. Give an account of different types of vascular bundles found in angiosperm plant.
3. Describe the differentiation of apical meristem in a Dicot plant.
4. Write explanatory notes on any **Four** of the following :—
 - (a) Types of Stomata
 - (b) Lenticels
 - (c) Abscission layer
 - (d) Periderm
 - (e) Healing of wood
 - (f) Guard cells and its role

GROUP 'B'

5. Describe Pollen tube growth through Pistil leading to fertilization.
6. Describe protocol for tissue culture of plant part.
7. Give an account of experimental embryology.
8. Describe causes of Polyembryony. What is its application ?
9. Give an account of morphological nature of Endosperm.
10. Describe the development of Female gametophyte in Angiosperm.

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M.Sc. Botany, Part-I

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NALANDA OPEN UNIVERSITY

M.Sc. Botany, Part-II PAPER-IX

(Plant Physiology and Biochemistry)
Annual Examination, 2019

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 account of the Physiology of flowering.
2. What are Phytohormones ? Describe the mode of action and role of Gibberellin.
3. Describe the mechanism of closing and opening of stomata.
4. Give an illustrated account of light reaction of Photosynthesis.
5. Write short notes on any **two** of the following :-
(a) Phototropism (b) Active transport
(c) Temperature stress in plants (d) CAM

GROUP 'B'

6. Describe the steps involved in formation of Pyruvic acid from Glucose.
7. What are enzymes ? Discuss the properties of enzymes.
8. What is Electron Transport Chain. How ATP is synthesized ?
9. What do you mean by biological nitrogen fixation. Give an account of the process.
10. Write short notes on any **two** of the following :-
(a) Nitrogen containing Secondary metabolites
(b) Co-enzymes
(c) Transamination
(d) Exothermic and Endothermic reactions

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M.Sc. Botany, Part-II

Programme for Practical Counselling Classes and Practical Examination, 2019

Venue : 1st Floor, Biscomaun Tower, Patna

Practical Counselling Class Programme

Enrollment No.	Batch	Date	Paper	Time (Daily)
All Old Students	B1	24.08.2019 & 25.08.2019	IX to XVI	10.00 AM to 4.30 PM
170260001 to 170260090	B2	29.08.2019 to 30.08.2019	IX to XVI	10.00 AM to 4.30 PM
170260091 to 170260258	B3	04.09.2019 to 05.09.2019	IX to XVI	10.00 AM to 4.30 PM

Practical Examination Programme

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26.08.2019	B1	IX	B1	X	B1	XI
27.08.2019	B1	XII	B1	XIII	B1	XIV
28.08.2019	B1	XV	B1	XVI	—	
31.08.2019	B2	IX	B2	X	B2	XI
02.09.2019	B2	XII	B2	XIII	B2	XIV
03.09.2019	B2	XV	B2	XVI	—	
06.09.2019	B3	IX	B3	X	B3	XI
07.09.2019	B3	XII	B3	XIII	B3	XIV
09.09.2019	B3	XV	B3	XVI	—	

NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-II
PAPER-X
(Cytogenetics and Crop Improvement)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Define crossing over. Describe the mechanism and types of crossing over.
2. Describe different types of Chromosomal aberration. What is its significance.
3. What is Genetic Engineering ? Describe different tools employed in Genetic Engineering.
4. Describe different molecular mechanism of mutation. Explain with examples.
5. Define polyploidy. Describe its origin, types and significance.
6. Give an account of the structure and significance of B-Chromosome.
7. Define monosomy. Describe human genetic disorder arising from monosomy.
8. Explain gene regulation in Prokaryotes (Lactose Operon).
9. What is interaction of Gene ? Give one example to explain. Now 9:3:3:1 ratio becomes modified ?
10. Write short notes on any two of the following :
 - (a) PCR technique to amplify DNA
 - (b) Bacteriophage as vectors
 - (c) Linkage
 - (d) Co-dominance

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09.09.2019	B3	XV	B3	XVI	—	

NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-II
PAPER–XI

(Molecular Biology)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Explain Operon concept of gene regulation in Prokaryotes.
2. What are different types of RNA in Prokaryotes and Eukaryotes. Briefly mention their role.
3. Describe Meselson and Stahl experiment to prove that replication of DNA is semi-conservative.
4. What is Genetic Code ? Describe essential properties of Genetic code.
5. Describe the concept of Phototrophs and Auxotrophs. How are they important in Genetic research ?
6. Describe the process of Transcription and Translation in Prokaryotes.
7. Write short notes on any two of the following :
 (a) Wobble hypothesis (b) Chargaff rule
 (c) Splicing (d) Initiation factor in Eukaryote
8. Explain briefly "One Gene One Enzyme" hypothesis. How it stands modified.
9. What is Transformation ? Describe its mechanism in Prokaryotes.
10. Write short notes on any two of the following :
 (a) Transposon
 (b) Exon & Intron
 (c) Types of DNA

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M.Sc. Botany, Part–II

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Practical Counselling Class Programme

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Practical Examination Programme

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NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-II
PAPER–XII
 (Environmental Biology)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Explain the flow of energy in an ecosystem. What is its significance ?
2. What do you mean by Green House effect ? How it can lead to Global Warming.
3. Give an account of Forest ecosystem.
4. Suggest ways for the conservation of Biodiversity.
5. Explain how different human activity are the major threat to biodiversity.
6. What is Environmental Impact Assessment (EIA) ? Discuss its importance in relation to development of a Country.
7. What do you mean by Red data categories ? What is its importance.
8. Describe the vegetational belt of India.
9. Write short notes on any **Two** of the following :—
 - (a) Ozone depletion and its significance
 - (b) Sources of air pollution and its type
 - (c) Interaction among population
10. Acquaint with natural disasters and write how to onitigate their hazards ?

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M.Sc. Botany, Part–II

Programme for Practical Counselling Classes and Practical Examination, 2019

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NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-II
PAPER–XIII
(Plant Resources, Utilization and Conservation)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Describe the method of Protoplast isolation and culture.
2. What are the implications of Green Revolution. Highlight its negative implication.
3. Describe different reason for depletion of Biodiversity.
4. Write briefly role of Natural parks in *in situ* conservation.
5. What are Fibres ? Describe different types of fibres of commercial use.
6. What are the principles and strategy of *ex situ* conservation.
7. Write the common name, Botanical name of three each of cereals, pulses and oil yielding plants.
8. Describe the methods of Germplasm conservation.
9. Write short notes on any **Two** of the following :—
 - (a) Importance of Bio-reserve in conservation
 - (b) Seed Bank
 - (c) Botanical names of four medicinal plants.
10. Write short notes on any **Two** of the following :—
 - (a) Coral reef and their importance
 - (b) Importance of ICAR in Research
 - (c) Vivipary
 - (d) Need of wild life protection

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M.Sc. Botany, Part–II

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NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-II
PAPER–XIV
(Ethnobotany)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Explain ethnomedicine as a discipline of Botany. Describe importance of studying this.
2. Give a brief account of any four of the drug Yielding plants. Also mention importance of studying this.
3. Describe various methods of *ex-situ* conservation.
4. Give a brief account of future strategy of ethnobotany.
5. Describe the method of storage of herbal drugs.
6. Name the original homeland of some important crops. Mention Vavilov's contribution in origin & cultivation of plants.
7. Write short notes on any **Two** of the following :—
 - (a) Drug therapy
 - (b) Seed gene bank
 - (c) IUCN
 - (d) CITES
8. Describe common spices and condiments and their importance.
9. Write short notes on any **Two** of the following :—
 - (a) Cryo preservation
 - (b) Vitamin-C
 - (c) Lipids
10. Write an essay on Centres of Ethnobotany in India.

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M.Sc. Botany, Part–II

Programme for Practical Counselling Classes and Practical Examination, 2019
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NALANDA OPEN UNIVERSITY
M.Sc. Botany, Part-II
PAPER–XV
(Aerobiology)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Give an account of Source of allergy and its various response.
2. Compare the ultrastructure of Prokaryotic and Eukaryotic cell.
3. Explain the various methods of release of fungal spore.
4. Write short notes on any **Two** of the following :—
 - (a) Food allergy
 - (b) Immunity
 - (c) Air borne allergy diseases
 - (d) Pollen grains as allergens
5. Write an essay on aeromycoflora.
6. What are different types of sampling technique. Explain it in detail.
7. Write short notes on :—
 - (a) Forecasting in relation to Aerobiology
 - (b) Viable and non-viable atmospheric air borne microbes.
8. Describe post-fertilization changes leading to formation of Ascospore in fungi.
9. Do you agree with the statement that Aerobiology is the discipline of Biology relevant to human and plant health ?
10. Describe the development of Male gametophyte in angiosperms.

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M.Sc. Botany, Part–II

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NALANDA OPEN UNIVERSITY

M.Sc. Botany, Part-II

PAPER–XVI

(Biotechnology and Bioinformatics)

Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. What do you mean by ex-plant ? How callus formation is induced ?
2. What are secondary metabolites ? Describe how and when secondary metabolites are produced by plants ?
3. Name five different types of enzymes used in recombinant DNA research. Specifically mention their role.
4. What do you mean by PCR ? How his technique is used to amplify DNA.

or

Describe the process involved in production of somatic hybrids.

5. What is micropropagation ? Describe this technique in a step-wise manner.
6. Give an account of the technique and application of Microarray technology.
7. Why *Agrobacterium* is described as natural genetic Engineer ? Explain.
8. Describe the Technique of Southern blotting.
9. Write short notes on any **Two** of the following :—
 - (a) Rh factor
 - (b) Proteomics
 - (c) Antigens
 - (d) Cybrid
10. Describe the technique of Protoplast isolation. How it can be regenerated ?

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M.Sc. Botany, Part–II

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