

Nalanda Open University

Annual Examination - 2019

B.Sc. Botany (Honours), Part-I

Paper-I

Time: 3.00 Hrs.

Full Marks: 80

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

1. Describe Ultra structure of a Cynophyceean cell studied by you.
2. Describe different method of reproduction in *Volvox*
3. Describe structure and reproduction of *Peziza* ?
4. What is Autoecious and Heteroecious rust. Describe life cycle of *Puccinia* on wheat.
5. What are the characteristic feature of Bryophytes? Give its classification up to the level of orders.
6. Describe the sporophyte of *Marchantia* ?
7. Give an account of stellar structure of *Lycopodium*?
8. Describe life cycle and evolutionary significance of *Psilotum*
9. Describe structure and reproduction of Lichen.
10. Write short notes on any four of the following
 - (a) Palmella stage
 - (b) Gemma cup
 - (c) Cleistothecium
 - (d) Obligate Parasite
 - (e) Elaters and Elaterophore
 - (f) Strobilus of *Selaginella*



Examination Programme, 2019

B.Sc (Part – I) All Honours Subjects

Except Geography, Home Science & Yoga Honours

(गृह विज्ञान, भूगोल और योग ऑनर्स को छोड़कर)

Date	Papers.	Time	Examination Centre
29/5/2019	(Hons) P-I	3.30 to 6.30 pm	Nalanda Open University, Patna
31/5/2019	(Hons) P-II	3.30 to 6.30 pm	Nalanda Open University, Patna
03/6/2019	Home Science (Sub)-P I	12 to 3 pm	Nalanda Open University, Patna
04/6/2019	Physics (Sub) P-I	12 to 3 pm	Nalanda Open University, Patna
07/6/2019	Rastrabhsha-100 or Hindi+Urdu or Eng	3.30 to 6.30 pm	Nalanda Open University, Patna
10/6/2019	Math (Sub) P-I	12 to 3 pm	Nalanda Open University, Patna
11/6/2019	Geography (Sub) P-I	12 to 3 pm	Nalanda Open University, Patna
12/6/2019	Zoology (Sub) P-I	12 to 3 pm	Nalanda Open University, Patna
14/6/2019	Chemistry (Sub) P-I	12 to 3 pm	Nalanda Open University, Patna
15/6/2019	Botany (Sub) P-I	12 to 3 pm	Nalanda Open University, Patna

B.Sc. Part-I Botany (Hons.)

Practical Counselling and Examination 2019

Venue : 1st Floor, Botany Lab, Biscomaun Tower, Patna

(A) Practical Counselling Class

Date	Paper	Time	Roll No
16.06.2019	I & II	10.00 AM to 04.00 PM	All Students Botany (Hons.)

(B) Practical Examination

Date	Time		Roll No.
	Paper-I	Paper-II	
18.06.2019	11:00 AM to 02:00 PM	02:30 PM to 05:30 PM	All Botany (Hons.) Students

Nalanda Open University
Annual Examination - 2019
B.Sc. Botany (Honours), Part-I
Paper-II

Time: 3.00 Hrs.

Full Marks: 80

Answer any Five questions. All questions carry equal marks.

1. Describe the development of female gametophyte of *Pinus*.
2. Give an account of the development of Male gametophyte of *Gnetum*
3. Describe different methods of fossilization and types of fossils.
4. Describe the seed of Lyginopteris. What is its Phylogenetic significance?
5. Describe the life cycle of a fossil found in Bihar and Jharkhand.
6. Write the floral characters of the following family along with floral formula and floral diagram.
 (a) Labiatac (b) Ranunculaceac
7. Write about the modern system of classification of Angiosperms.
8. Describe the fructification of fossil *Calamites*
9. Write short notes on any two of the following:
 (a) Hypanthodium (b) Sporophyte of Rhynia
 (c) Cyathium (d) Verticillaster.
10. Write briefly about the following
 (a) International code of Botanical nomenclature
 (b) Four plants of economic importance
 (Botanical name and Family.)



B.Sc. Part-I Botany (Hons.)
Practical Counselling and Examination 2019
Venue : 1st Floor, Botany Lab, Biscomaun Tower, Patna
(A) Practical Counselling Class

Date	Paper	Time	Roll No
16.06.2019	I & II	10.00 AM to 04.00 PM	All Students Botany (Hons.)

(B) Practical Examination

Date	Time		Roll No.
	Paper-I	Paper-II	
18.06.2019	11:00 AM to 02:00 PM	02:30 PM to 05:30 PM	All Botany (Hons.) Students

Nalanda Open University
Annual Examination - 2019
B.Sc. Botany (Subsidiary), Part-I
Paper-I

Time: 3.00 Hrs.

Full Marks: 80

Answer any Five questions. All questions carry equal marks.

1. What are the characteristic feature of Virus. Describe ultrastructure of a Bacteriophage.
2. Describe the structure and reproduction of *Chlamydomonas*.
3. Describe life cycle of *Albugo*.
4. Give an account of sporophyte of *Sparganium*. How it differs from *Marchantia*.
5. Describe the strobilus of *Selaginella*. What is its significance?
6. Describe any four of the following.
 - (a) Syncarpous
 - (b) Syngenesious
 - (c) Cyathium
 - (d) Verticillaster
 - (e) Free central placentation
 - (f) Floral diagram.
 - (g) Anatriplex
7. Describe floral characters floral formula and floral diagram of family lamiaceae. Name two plants of economic importance.
8. Describe Characteristic feature of a gymnosperm studied by you.
9. Mention briefly the important features of Bentham and Hooker system of classification.
10. Assign the following plants to their family along with botanical names.
 - (a) Mango
 - (b) Wheat
 - (c) Rice
 - (d) Potato



Nalanda Open University

Annual Examination - 2019

B.Sc. Botany (Honours), Part-II

Paper-III

Time: 3.00 Hrs.

Full Marks: 80

Answer Five questions, selecting atleast one question from each group A, B and C.

All questions carry equal marks.

Group - A (Microbiology)

1. What is Genetic recombination? Describe any one method of Genetic recombination in Bacteria.
2. Give an account of ultra-structure of Tobacco Mosaic virus. How do they reproduce?
3. Mention briefly industrial importance of Bacteria.

Group - B (Plant Pathology)

4. What is Toxin? Describe role of toxins in plant disease development.
5. Describe steps involved in infection in plant by a fungal pathogen.
6. Write short notes on any two of the following:-
 - (a) Disease forecasting system
 - (b) Late blight of potato
 - (c) Little leaf of Brinjal
 - (d) Structural defense in plants
7. Write etiology, symptoms and control of wilt of Pigeon Pea.

Group - C (Embryology)

8. Describe development of any one type of embryo studied by you.
9. What are endosperms? What are its significance in plants.
10. Write short notes on:-
 - (a) Double fertilization
 - (b) Anther culture.



Programme of B.Sc. Part-II Botany (Hons.),
Practical Class and Practical Examination, 2019

Venue:- 1st Floor, Botany Lab, Biscomaun Tower, Patna

(A) Practical Counselling Class

Date	Paper	Time
09.06.2019	III & IV	11.00 AM to 05.00 PM

(B) Practical Examination

Date	Paper	Time
10.06.2019	III	11.00 AM to 02.00 PM
10.06.2019	IV	02.30 PM to 05.30 PM

Examination Programme, 2019

(Bachelor of Science (Part-II))

All Science Subjects Except B.Sc Geography & Home Science (Honours)

(बी.एस.सी भूगोल और गृह विज्ञान (ऑनर्स) को छोड़कर विज्ञान के सभी आनर्स विषय)

Date	Paper	Time	Name of Examination Centre
28/5/2019	HONOURS PAPER – III	12.00 to 3.00 pm	Nalanda Open University, Patna
30/5/2019	HONOURS PAPER – IV	12.00 to 3.00 pm	Nalanda Open University, Patna
01/6/2019	Hindi 100 or Ur 50+Hn 50	12.00 to 3.00 pm	Nalanda Open University, Patna
03/6/2019	(SUB.) (Botany- II)	8.00 to 11.00 am	Nalanda Open University, Patna
04/6/2019	(SUB.) (Mathematics - II)	8.00 to 11.00 am	Nalanda Open University, Patna
06/6/2019	(SUB.) (Chemistry - II)	8.00 to 11.00 am	Nalanda Open University, Patna
07/6/2019	(SUB.) (Physics - II)	8.00 to 11.00 am	Nalanda Open University, Patna
08/6/2019	(SUB.) (Zoology - II)	8.00 to 11.00 am	Nalanda Open University, Patna
11/6/2019	(SUB.) (Geography - II)	8.00 to 11.00 am	Nalanda Open University, Patna
13/6/2019	(SUB.) (Home Science- II)	8.00 to 11.00 am	Nalanda Open University, Patna

Nalanda Open University

Annual Examination - 2019

B.Sc. Botany (Honours), Part-II

Paper-IV

Time: 3.00 Hrs.

Full Marks: 80

Answer *Five* questions, selecting at least one question from each group A, B and C.
All questions carry equal marks.

Group - A (Anatomy)

1. Describe anatomical features of Hydrophytic plants.
2. What is Periderm ? Describe functions of different periderms.
3. What is secondary growth ? Describe abnormal secondary growth in any plant of your choice.

Group - B (Cell Biology)

4. Describe detailed structure of Eukaryotic Nucleus, mention function of different parts.
5. What are enzymes? Describe different types of enzymes studied by you.
6. Write short notes on any four of the following :
 - (a) Nucleoside
 - (b) Solenoid model
 - (c) tRNA
 - (d) Alkaloids
 - (e) Micronutrients
 - (f) Peroxisome
7. What are vitamins? Give an account of vitamin B.
8. How protein is synthesized from amino acids? Mention briefly.

Group - C (Economic Botany)

9. Give an account of Pulses of Bihar.
10. What are fibers? Describe three fiber fielding plants of Bihar



Programme of B.Sc. Part-II Botany (Hons.),

Practical Class and Practical Examination, 2019

Venue:- 1st Floor, Botany Lab, Biscomaun Tower, Patna

(A) Practical Counselling Class

<i>Date</i>	<i>Paper</i>	<i>Time</i>
09.06.2019	III & IV	11.00 AM to 05.00 PM

(B) Practical Examination

<i>Date</i>	<i>Paper</i>	<i>Time</i>
10.06.2019	III	11.00 AM to 02.00 PM
10.06.2019	IV	02.30 PM to 05.30 PM

Nalanda Open University
Annual Examination - 2019
B.Sc. Botany (Subsidiary), Part-II
Paper-II

Time: 3.00 Hrs.

Full Marks: 80

Answer any Five questions. All questions carry equal marks.

1. What are different types of vascular bundles in plant? Give one example for each.
2. What are meristems? Name different types of meristems.
3. Describe the process of fertilization in angiosperms.
4. Describe the ultrastructure of chloroplast. Highlight its function
5. Describe the process of transpiration in plant.
6. What do you mean by ecosystem? Describe any ecosystem studied by you.
7. Describe Kreb's Cycle. Mention its significance.
8. Name four drug yielding or oil yielding plants, with their botanical names and families.
9. Write short notes on any four of the following:-

(a) A Biological magnification	(b) Green house effect.
(c) Soil conservation	(d) Types of DNA
(e) Air pollution	(f) Biosphere
10. Describe the ultrastructure of chromosome.



Programme of B.Sc. Part-II Botany (Subsidiary)
Practical Class and Examination, 2019

Venue:- 1st Floor, Botany Lab Biscomaun Tower,, Patna

(A) Description of **Batches** for Counselling and Exam for Paper-II (Subs.)

(1) Counselling Class and Batch description :-

<i>Date</i>	<i>Subject & Roll No.</i>	<i>Batch</i>	<i>Time</i>
12.06.2019	<i>All Student of Chemistry (H), Home. Sc.(H), Geography (H), & Zoology (H) All Old students, Zoology (H) 170510001 to 170510100</i>	B₁	<i>08.00 AM to 11.00 AM</i>
12.06.2019	<i>Zoology (H) 170510101 to 170510436</i>	B₂	<i>11.00 AM to 02.00 PM</i>

(2) Practical Examination

<i>Date</i>	<i>Time (09.00 AM to 11.00 AM)</i>	<i>Paper</i>
14.06.2019	Batch B₁	Subsidiary Paper-II
15.06.2019	Batch B₂	Subsidiary Paper-II

Nalanda Open University
Annual Examination - 2019
B.Sc. Botany (Honours), Part-III
Paper-V (Physiology and Biochemistry)

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. Questions No. 1 is compulsory. All questions carry equal marks.

1. Multiple choice questions:

- (i) The enzyme responsible for primary carboxylation in C₃ plants is :
 - (a) Pyruvate carboxylase
 - (b) Succinic dehydrogenase
 - (c) Hexokinase
 - (d) RUBP carboxylase oxygenase.
- (ii) Chemiosmosis hypotheses given by Peter Mitchel proposes the mechanism of :
 - (a) Synthesis of NADH
 - (b) Synthesis of ATP
 - (c) Synthesis of FADH₂
 - (d) Synthesis of NADH
- (iii) Coconut milk is :
 - (a) An auxin
 - (b) A gibberellin
 - (c) Absciscic acid
 - (d) Cytokinin
- (iv) Which one of the following is a gaseous plant hormone :
 - (a) Ethylene
 - (b) IAA
 - (c) Gibberellin
 - (d) Absciscic acid
- (v) The most abundant biomolecule on the earth :
 - (a) Nucleic acids
 - (b) Proteins
 - (c) Lipids
 - (d)

Carbohydrates

- (vi) Lactose is a disaccharide consists of :
 - (a) Glucose and Fructose
 - (b) Glucose and Galactose
 - (c) Glucose and Sucrose
 - (d) Glucose and Ribose
 - (vii) The factor which decreases transpiration is :
 - (a) Water
 - (b) Humidity
 - (c) Wind
 - (d) Light
 - (viii) Which of the following plant material is an efficient water imbibant :
 - (a) Lignin
 - (b) Agar
 - (c) Pectin
 - (d) Cellulose
2. Describe Calvin cycle in detail.
3. Explain different stages of Nitrogen cycle.
4. Describe the mechanism of opening and closing of stomata.
5. Differentiate between Photophosphorylation and oxidative phosphorylation. Describe briefly Krep's cycle.
6. Give an account of Phytochrome system. How it supports flower initiation.
7. What are trace elements ? What role do these play in the physiology of plants.
8. Explain the following :
 - (a) Plasmolysis
 - (b) Deplasmolysis
 - (c) Endosmosis
 - (d) Exosmosis
9. Explain the mechanism of geotropism in plants.
10. Write short notes on any two of the following :
 - (a) Condensation of fatty acids and glycerol
 - (b) Chemotropism
 - (c) Electron transport system (ETS)
 - (d) Nitrification and Denitrification.



Nalanda Open University
Annual Examination - 2019
B.Sc. Botany (Honours), Part-III
Paper-VI (Environmental Biology)

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. Questions No. 1 is compulsory. All questions carry equal marks.

1. Multiple choice questions:
 - (i) Which one the following three R's are regarded as environmental friendly.

(a) Reduce, Reuse, Recycle	(b) Read, Register, Recall
(c) Random, Reduce, Recall	(d) Reduce, Rebuild, Restrict
 - (ii) To conserve coral reefs the Government of India declared one the following as marine park.

(a) Gulf of manar	(b) Andaman islands
(c) Gulf of Kutch	(d) Lakshadeep island.
 - (iii) The environment includes.

(a) Abiotic factors	(b) Biotic factors
(c) Oxygen and Nitrogen	(d) Abiotic and Biotic factors.
 - (iv) In a pond ecosystem the top area where the production is greater than Respiration is termed as:

(a) Limnetic Zone	(b) Profundal Zone
(c) Benthic Zone	(d) Tidal Zone
 - (v) The energy flow in an ecosystem is :

(a) In any direction	(b) Always unidirectional
(c) Always bi-directional	(d) Always down-directional
 - (vi) Pick out the odd one :

(a) Oxygen cycle	(b) Phosphorous cycle
(c) Carbon cycle	(d) Nitrogen cycle
 - (vii) According to IUCN red list what is the status of Red Panda?

(a) Critically endangered	(b) <i>Extinct species.</i>
(c) Vulnerable species	(d) <i>Endangered species</i>
 - (viii) Nitrifying bacteria produce.

(a) $\text{NH}_3 \rightarrow \text{NO}_3$	(b) $\text{NO}_3 \rightarrow \text{N}$	(c) Protein $\rightarrow \text{NH}_3$
(d) None of these.		
2. What do you mean by social forestry? Describe the social forestry along with its advantage.
3. Describe different components of ecosystem. Give an account of Pond ecosystem.
4. What do you understand by the term succession? Describe succession on a bare piece of rock.
5. What is conservation? Describe method of soil conservation.
6. Give an account of Pollution, Explain water pollution and measures to control it.
7. Explain the following Terms.

(a) Algal blooms	(b) Biomagnification	(c) Chipko movement
(d) Allelopathy.		
8. What is population ? Describe the Characteristic of population of an organism.
9. Describe different categories of natural resources.
10. Write short notes on any **two** of the following

(a) Food chain	(b) Hydrosere
(c) Protected area	(d) Green house gases.

Programme of B.Sc. Part-III Botany (Hons.)

Annual Practical Counselling & Practical Examination - 2019

Venue : 1st Floor Biology Lab, Biscomaun Tower, Patna - 800 001

(A) Practical Counselling Botany

Date	Time	Paper
18.04.2019	11.00 AM to 05.30 PM	V and VI
20.04.2019	11.00 AM to 05.30 PM	VII and VIII

(B) Practical Examination Botany

Date	Time	
	11:00 AM to 2:00 PM	2:30 PM to 5:30 PM
22.04.2019	Paper-V	Paper-VI

24.04.2019	Paper-VII	Paper-VIII
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Nalanda Open University
Annual Examination - 2019
B.Sc. Botany (Honours), Part-III
Paper-VII (Cytogenic and Molecular Biology)

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. Questions No. 1 is compulsory. All questions carry equal marks.

1. Multiple choice questions :
 - (i) The genetic instruction for forming a polypeptide chain are carried to the ribosome by the
 - (a) tRNA
 - (b) rRNA
 - (c) mRNA
 - (d) DNA
 - (ii) All of the following enzymes are involved in DNA replication except.
 - (a) Helicase
 - (b) Primase
 - (c) DNA polymerase
 - (d) RNA polymerase
 - (iii) Which of the following forces stabilize the DNA double helix structure
 - (a) Hydrogen bonds
 - (b) Stacking interactions between complementary bases
 - (c) Supercoiling structure
 - (d) All of them.
 - (iv) DNA replication results in.
 - (a) Polymerase I
 - (b) Polymerase III
 - (c) Polymerase II
 - (d) All
 - (v) Chromosome measurement are taken generally during.
 - (a) Interphase
 - (b) Prophase
 - (c) Anaphase
 - (d) None of these
 - (vi) Sonalika and Kalyan sona are high yielding varieties of :
 - (a) Rice
 - (b) Wheat
 - (c) Maize
 - (d) Sugarcane
 - (vii) Breeding for disease resistance requires:
 - (a) Good source of resistance
 - (b) Disease test
 - (c) Planned hybridization
 - (d) All the above
 - (viii) The end product of Translation are:
 - (a) Amino acids
 - (b) Lipids
 - (c) Polypeptides
 - (d) All of these
2. Describe different types of RNA. Also mention their role in cell function.
3. What is a cell cycle ? Explain different stages of cell cycle mentioning its significance.
4. What do you understand by interaction of gene. How Mendelian dihybrid ratio stands modified due to interaction. Cite one example.
5. What is Linkage ? Cite one suitable example to explain Linkage.
6. What is cytoplasmic inheritance? Give suitable example and its characteristics.
7. Give an account of Ultra structure of chromosome (Nucleosome model)
8. What is plant breeding? Describe different steps of plant breeding.
9. Write briefly about the following:-
 - (a) Exon and Intron
 - (b) Sense codon and Nonsense codon
 - (c) Operon
 - (d) Semi conservative replication of DNA
10. Write short notes on any two of the following.
 - (a) Translocation
 - (b) B chromosome
 - (c) Polytene chromosome
 - (d) Lamp brush chromosome.



Programme of B.Sc. Part-III Botany (Hons.)

Annual Practical Counselling & Practical Examination - 2019

Venue : 1st Floor Biology Lab, Bismaun Tower, Patna - 800 001

(A) Practical Counselling Botany

Date	Time	Paper
18.04.2019	11.00 AM to 05.30 PM	V and VI
20.04.2019	11.00 AM to 05.30 PM	VII and VIII

(B) Practical Examination Botany

Date	Time	
	11:00 AM to 2:00 PM	2:30 PM to 5:30 PM
22.04.2019	Paper-V	Paper-VI
24.04.2019	Paper-VII	Paper-VIII

Nalanda Open University

Annual Examination - 2019

B.Sc. Botany (Honours), Part-III

Paper-VIII (Genetics)

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. Questions No. 1 is compulsory. All questions carry equal marks.

- Multiple choice questions:
 - The hybrid progeny in the first generation is called as:
(a) F_0 (b) F_1 (c) F_2 (d) F_t
 - The monohybrid ratio is:
(a) 9 : 3 : 3 : 1 (b) 9 : 1 (c) 9 : 3 : 1 (d) 3 : 1
 - The crossing of F_1 to any of the parents is called
(a) Back cross (b) Test cross (c) F_1 cross (d) All of these
 - The process of removing stamens from the flower during hybridization is called.
(a) Capping (b) Selfing (c) Crossing (d) Emasculation
 - Alleles are :
(a) Linked genes (b) Alternative forms of a gene
(c) Homologous Chromosomes (d) Chromosome that have crossed over.
 - UAA is known as :
(a) Opal (b) Amber (c) Ochre (d) None of these
 - Shortest phase in mitosis is
(a) Prophase (b) Anaphase (c) Metaphase (d) Telophase
 - Explants used for tissue culture can be taken from
(a) Bud (b) Root tip (c) Nodal stem segments (d) All of these
- Give an account of Role of mutation in plant breeding.
- What is Genetic code ? Highlight the characteristic of Genetic Code.
- Write short notes on any two of the following:
(a) Banding Technique (b) Physical mutagens
(c) Restriction Endonuclease (d) Genetic counselling
- Write short notes on any two of the following. with suitable example.
(a) Mean (b) Median (c) Mode (d) Standard
- Describe different phases of meiosis. Describe prophase -1 with suitable explanation and diagram.
- What is Polyploidy? What are different types of Polyploidy. Describe *Raphanobrassica* as allotetraploid.
- What is genetic engineering? Describe briefly various steps in genetic engineering.
- Write short notes on the following :
(a) Inborn error of metabolism (b) Cell cycle
- Under what circumstances 9 : 3 : 3 : 1 ratio stands modified. Give one example to explain it.



Programme of B.Sc. Part-III Botany (Hons.)

Annual Practical Counselling & Practical Examination - 2019

Venue : 1st Floor Biology Lab, Biscomaun Tower, Patna - 800 001

(A) Practical Counselling Botany

Date	Time	Paper
18.04.2019	11.00 AM to 05.30 PM	V and VI
20.04.2019	11.00 AM to 05.30 PM	VII and VIII

(B) Practical Examination Botany

Date	Time	
	11:00 AM to 2:00 PM	2:30 PM to 5:30 PM
22.04.2019	Paper-V	Paper-VI
24.04.2019	Paper-VII	Paper-VIII