

**Nalanda Open University**  
**Annual Examination - 2022**  
**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 the structure and reproduction of *Chara* or *Oedogonium*.
2. Describe the life cycle of *Alternaria*.
3. Describe the life cycle of a rust disease causing fungus on wheat.
4. Describe life cycle of *Albugo*.
5. Describe sporophyte of *Anthoceros*. What light does it throw on the evolution of land plant ?
6. Describe the sex organ of *Marchantia*. How male gametes and female gametes are formed ?
7. Write short notes on :  
(a) Heterospory and seed Habit (b) Fruiting body of Ascomycetes
8. Write short notes on any Four of the following :-  
(a) Elaters (b) Lichen (c) Gemma cup (d) Protonema  
(e) Akinete (f) Palmella stage (g) Mycorrhiza
9. What is Isomorphic alternation of generation with reference to the life cycle of *Ectocarpus*.
10. Describe various method of vegetative reproduction in Bryophytes studied by you.



**EXAMINATION PROGRAMME, 2022**  
**B.Sc. Physics, Mathematics, Botany & Zoology (Hons.), Part-I**

<b>Date</b>	<b>Papers</b>	<b>Time</b>	<b>Examination Centre</b>
19.12.2022	Honours Paper-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
21.12.2022	Honours Paper-II	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
22.12.2022	Hindi Composition-100 or Hindi-50 + Urdu-50 or Eng-50	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
26.12.2022	Chemistry (Sub)-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
29.12.2022	Physics (Sub)-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
30.12.2022	Botany (Sub)-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
03.01.2023	Mathematics (Sub)-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
04.01.2023	Zoology (Sub)-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
06.01.2023	Geography (Sub) P-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna
10.01.2023	Home Science (Sub) P-I	2.30 PM to 5.30 PM	Nalanda Open University, 2 <sup>nd</sup> Floor, Biscomaun Bhawan, Patna

**Nalanda Open University**  
**Annual Examination - 2022**  
**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 method of development of Male Gametophyte of *Pinus*.
2. Mention the main angiospermic feature of Gnetum.
3. Describe different methods of Fossilization.
4. Describe important character found in the strobilus of Lepidodendron.
5. Write short notes on :  
(a) Female gametophyte of Taxus      (b) Fructification of Calamites
6. Briefly describe classification of Angiosperm as proposed by Hutchinson.
7. Describe floral characters, Floral diagram and floral formula of two members of family Ranunculaceae or Lamiaceae.
8. Write short notes on any **Two** of the following:  
(a) Types of Racemose inflorescence    (b) Types of aestivation    (c) Types of Placentation
9. Give an account of economic importance of Gymnosperms.
10. "Rhynia is the most primitive plant" Discuss.



**Programme of B.Sc. Part-I Botany (Hons.)**  
**Practical Counselling and Examination 2022**  
**Venue : 1st Floor, Botany Lab, Biscomaun Tower, Patna**  
**(A) Practical Counselling Class**

<i>Enrollment No.</i>	<i>Batch</i>	<i>Date</i>	<i>Time</i>	<i>Paper</i>
<i>All Old Student &amp; 210460001 to 210460045</i>	<i>B1</i>	<i>27.12.2022</i>	<i>09.00 AM to 01.00 PM</i>	<i>I &amp; II</i>
<i>210460046 to 190460090</i>	<i>B2</i>	<i>27.12.2022</i>	<i>01.30 PM to 05.30 PM</i>	<i>I &amp; II</i>

**(B) Practical Examination**

<i>Date</i>	<i>09.00 AM to 11.00 AM</i>		<i>11.00 AM to 01.00 PM</i>	
	<i>Batch</i>	<i>Paper</i>	<i>Batch</i>	<i>Paper</i>
07.01.2023	B1	I	B1	II
09.01.2023	B2	I	B2	II

**Nalanda Open University**  
**Annual Examination - 2022**  
**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. Describe the structure and reproduction in *Chara*.
2. Give an account of the reproduction in Lichens.
3. Describe life cycle of *Peziza*.
4. Describe the life cycle of *Puccinia graminis* on wheat.
5. Describe the anatomical structure of the stem of *Equisetum*.
6. What is abnormal secondary growth ? Describe with reference to secondary growth in *Boerhaavia*.
7. Write the floral character, floral formula and floral diagram of family Cucurbitaceae.
8. Describe the economic importance of Bacteria.
9. Describe the life cycle of *Selaginella*.
10. Write short notes on the following :-
  - (a) Verticillaster
  - (b) Hypanthodium
  - (c) Apocarpus
  - (d) Gemma cup & Axile placentation.



**Practical Counselling Classes and Practical Examination Programme, 2022 of**  
**B.Sc., Part-I (Botany Subsidiary, Paper-I)**  
**Venue : Botany/Zoology Lab, 1<sup>st</sup> Floor, Biscomaun Tower, Patna**

**PRACTICAL COUNSELLING CLASS PROGRAMME**

Date	Enrollment No.	Batch	Paper	Time
05.01.2023	All Old Students of Zoology (Hons.) and New : 210510001 to 2105101112	B1	I (Subsidiary)	09:00 AM to 10:30 AM
05.01.2023	210510113 to 210510271	B2	I (Subsidiary)	10:30 AM to 12:00 PM
05.01.2023	210510272 to 210510475	B3	I (Subsidiary)	12:30 PM to 02:00 PM
05.01.2023	210510476 to 210510610	B4	I (Subsidiary)	02:00 PM to 03:30 PM
05.01.2023	All Students of Chemistry (Hons.), Physics (Hons.), Math (Hons.), Home Sc. (Hons.) and Geography (Hons.)	B5	I (Subsidiary)	04:00 PM to 05:30 PM

**PRACTICAL EXAMINATION PROGRAMME**

Date	Enrollment No.	Batch	Paper	Time
08.01.2023	All Old Students of Zoology (Hons.) and New : 210510001 to 2105101112	B1	I (Subsidiary)	09:00 AM to 11:00 AM
08.01.2023	210510113 to 210510271	B2	I (Subsidiary)	11:00 AM to 01:00 PM
10.01.2023	210510272 to 210510475	B3	I (Subsidiary)	09:00 AM to 11:00 AM
10.01.2023	210510476 to 210510610	B4	I (Subsidiary)	11:00 AM to 01:00 PM
12.01.2023	All Students of Chemistry (Hons.), Physics (Hons.), Math (Hons.), Home Sc. (Hons.) and Geography (Hons.)	B5	I (Subsidiary)	09:00 AM to 11:00 AM

**Nalanda Open University**  
**Annual Examination - 2021**  
**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. Describe properties and structure of a *Tobacco Mosaic Virus*.
2. Describe structure and reproduction of *Oedogonium*.
3. Describe life cycle of *Albugo*.
4. Give an account of sporophyte of *Marchantia*.
5. Describe the strobilus of *Selaginella*. What is its significance in heterospory?
6. Describe the mode of reproduction in a Pteridophyte studied by you.
7. Describe any four of the following:
 

(a) Apocarpous	(b) Actinomorphic	(c) Cyathium
(d) Verticillaster	(e) Placentation	(f) Floral diagram
8. Describe floral characters, floral formula and floral diagram of family. *Lamiaceae*. Write botanical names of two plants of the family.
9. Describe Male gametophyte of *Pinus*.
10. Assign the following plants to their family.
 

(a) Potato	(b) Turnip	(c) Banana	(d) Riccinus
(e) Rice	(f) Wheat	(g) Mentha	(h) Mango



**Practical Counselling Classes and Practical Examination Programme, 2021 of**

**B.Sc., Part-I (Botany Subsidiary, Paper-I)**

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

**PRACTICAL COUNSELLING CLASS PROGRAMME**

Date	Time	
	8:00 AM to 9:30 AM	9:30 AM to 11:00 AM
31.03.2022	Enrollment No. of Zoology (Hons.) Students All Old Students & 200510001 to 200510109	Enrollment No. of Zoology (Hons.) Students 200510110 to 200510200
02.04.2022	Enrollment No. of Zoology (Hons.) Students 200510201 to 200510295	Enrollment No. of Zoology (Hons.) Students 200510296 to 200510495
07.04.2022	—	Enrollment No. of Zoology (Hons.) Students 200510496 to 200510630
09.04.2022	All New & Old Students of Chemistry (Hons.), Physics (Hons.), Mathematics (Hons.), Yoga (Hons.), Geography (Hons.) & Home Science (Hons.)	—

**PRACTICAL EXAMINATION PROGRAMME**

Date	Time		
	8:00 AM to 10:00 AM	2:00 PM to 4:00 PM	4:00 PM to 6:00 PM
01.04.2022	—	Enrollment No. of Zoology (Hons.) Students All Old Students & 200510001 to 200510109	Enrollment No. of Zoology (Hons.) Students 200510110 to 200510200
04.04.2022	—	Enrollment No. of Zoology (Hons.) Students 200510201 to 200510295	Enrollment No. of Zoology (Hons.) Students 200510296 to 200510495
08.04.2022	—	Enrollment No. of Zoology (Hons.) Students 200510496 to 200510630	—
11.04.2022	All New & Old Students of Chemistry (Hons.), Physics (Hons.), Mathematics (Hons.), Yoga (Hons.), Geography (Hons.) & Home Science (Hons.)	—	—

**Nalanda Open University**  
**Annual Examination - 2022**  
**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. Give an account of ultra-structure of a Bacterial Cell.
2. Describe any one method of Genetic recombination in Bacteria.
3. Give an account of degradation of Agriculture produce by microbes.

**Group - B (Plant Pathology)**

4. Describe the role of enzymes in pathogenesis.
5. Write pathological notes on any two of the following :-  
(a) *Late blight of potato* (b) *Citrus canker*  
(c) Biochemical defense of the host (d) *Early blight of Potato*
6. Write etiology, symptoms and control of *Wilt of pigeon pea*.
7. How does a fungus invades the host plant. Describe briefly.

**Group - C (Embryology)**

8. What are Endosperms ? What is its significance in Plant ?
9. Write short notes on any *Two* of the following :-  
(a) Double fertilization (b) Anther culture  
(c) Apomixis (d) Parthenocarpy
10. Give an account of development of any one type of embryo sac studied by you.



**Nalanda Open University, Patna**  
*Programme of B.Sc. Part-II Botany (Hons.),*  
*Practical Class and Practical Examination, 2022*  
Venue:- 1st Floor, Botany Lab, Biscomaun Tower, Patna  
**(A) Practical Counselling Class For all Students**

<i>Date</i>	<i>Enrollment No</i>	<i>Paper</i>	<i>Time</i>
14.01.2023	All Old & New Students	III & IV	11.00 AM to 03.00 PM

**(B) Practical Examination 2022 for all Students**

<i>Date</i>	<i>Enrollment No</i>	<i>Paper</i>	<i>Time</i>
16.01.2023	All Old & New Students	III	09.00 AM to 11.00 AM
		IV	11.00 AM to 01.00 PM

**Nalanda Open University**  
**Annual Examination - 2022**  
**B.Sc. Botany (Honours), Part-II**  
**Paper-IV**

**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 (Anatomy)**

1. Describe the anatomical feature of Hydrophytes.
2. Define tissue. Describe different types of tissues found in plants.
3. What is abnormal secondary growth ? Describe abnormal secondary growth in Boerhaavia plants.

**Group - B (Cell Biology)**

4. Describe detailed structure of Mitochondria or Nucleus. What is its function ?
5. What are enzymes ? Describe the classification of enzymes.
6. Write short notes on any **Four** of the following:  
(a) Nucleotide (b) Nucleosome  
(c) Structure of chromosome (d) Functions of Carbohydrate  
(e) Alkaloids (f) Micronutrients

7. What are lipids ? Classify different types of lipids.

**Or**

Describe briefly Protein synthesis in Prokaryotes.

8. What are Vitamins ? Give an account of Vitamin B.

**Group - C (Economic Botany)**

9. Give an account of pulses of Bihar :
10. Write the botanical name and family of:  
(a) Two medicinal plants. (b) Two fruit yielding plants  
(c) Two vegetables yielding plants (d) Two spices yielding plants



**Nalanda Open University, Patna**  
*Programme of B.Sc. Part-II Botany (Hons.),*  
**Practical Class and Practical Examination, 2022**  
Venue:- 1st Floor, Botany Lab, Biscomaun Tower, Patna

**(A) Practical Counselling Class For all Students**

Date	Enrollment No	Paper	Time
14.01.2023	All Old & New Students	III & IV	11.00 AM to 03.00 PM

**(B) Practical Examination 2022 for all Students**

Date	Enrollment No	Paper	Time
16.01.2023	All Old & New Students	III	09.00 AM to 11.00 AM
		IV	11.00 AM to 01.00 PM



**Nalanda Open University**  
**Annual Examination - 2022**  
**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 Meristems? Name different types of meristems.
2. Describe different stages of Mitosis.
3. Describe the Physical and Chemical structure of DNA.
4. Describe the ultrastructure of Chloroplast.
5. What is Endosperm? Describe different types of Endosperms found in angiosperms.
6. Describe the process of transpiration in plants.
7. What do you mean by ecosystem? Describe a forest ecosystem.
8. Name four drug yielding plants of Bihar. Write their botanical names and medicinal importance.
9. Describe Kreb's cycle.
10. What is pollution? Give an account of Air Pollution.



**B.Sc. Botany (Subsidiary), Part II, for All Honours,  
Annual Practical Counselling and Examination 2022  
Venue: 1st Floor, Botany and Zoology Lab, Biscomaun Tower, Patna-1**

*(A) Practical Counselling Class Programme*

<i>Date</i>	<i>Enrollment No.</i>	<i>Batch</i>	<i>Paper</i>	<i>Time</i>
02.02.2023	For Zoology(Hons) Students All Old Students and New Students (200510001 to 200510280)	B1	II(Sub.)	11.00 AM to 01.00 PM
	For Zoology(Hons.) New Studnets (200510281 to 200510650) And All old and New Students of Chemistry (Hons.), Physics(Hons.), Math(Hons.), Geography(Hons.) Home Science(Hons.) and Yoga(Hon's)	B2	II(Sub.)	09:00 AM to 11:00 AM

*(B) Practical Examination Programme*

<i>Date</i>	<i>Enrollment No.</i>	<i>Batch</i>	<i>Paper</i>	<i>Time</i>
03.02.2023	For Zoology(Hons) Students All Old Students and New Students (200510001 to 200510280)	B1	II(Sub.)	11.00 AM to 01.00 PM
	For Zoology(Hons.) New Studnets (200510281 to 200510650) And All old and New Students of Chemistry (Hons.), Physics(Hons.), Math(Hons.), Geography(Hons.) Home Science(Hons.) and Yoga(Hon's)	B2	II(Sub.)	08:00 AM to 10:00 AM



**B.Sc. Botany (Subsidiary), Part II, for All Honours,  
Annual Practical Counselling and Examination 2022  
Venue: 1st Floor, Botany and Zoology Lab, Biscomaun Tower, Patna-1  
(A) Practical Counselling Class Programme**

<i>Date</i>	<i>Enrollment No.</i>	<i>Batch</i>	<i>Paper</i>	<i>Time</i>
02.02.2023	For Zoology(Hons) Students All Old Students and New Students (200510001 to 200510280)	B1	II(Sub.)	11.00 AM to 01.00 PM
	For Zoology(Hons.) New Studnets (200510281 to 200510650) And All old and New Students of Chemistry (Hons.), Physics(Hons.), Math(Hons.), Geography(Hons.) Home Science(Hons.) and Yoga(Hon's)	B2	II(Sub.)	09:00 AM to 11:00 AM

**(B) Practical Examination Programme**

<i>Date</i>	<i>Enrollment No.</i>	<i>Batch</i>	<i>Paper</i>	<i>Time</i>
03.02.2023	For Zoology(Hons) Students All Old Students and New Students (200510001 to 200510280)	B1	II(Sub.)	11.00 AM to 01.00 PM
	For Zoology(Hons.) New Studnets (200510281 to 200510650) And All old and New Students of Chemistry (Hons.), Physics(Hons.), Math(Hons.), Geography(Hons.) Home Science(Hons.) and Yoga(Hon's)	B2	II(Sub.)	08:00 AM to 10:00 AM

**Nalanda Open University**  
**Annual Examination - 2022**  
**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) What is the end product of Calvin cycles:
 

(a) PGA	(b) RuBP
(c) PGAL	(d) ADP+NADP
  - (ii) Which of the following is known as a Hatch-Slack Pathway?
 

(a) C2	(b) C#
(c) C4	(d) C5
  - (iii) Who gave the root pressure theory?
 

(a) J C BOSE	(b) Godlewski	(c) Stephen Hales
(d) Boehm		
  - (iv) Wilt of a plant is a result of excessive-
 

(a) Transpiration	(b) Absorption	(c) Photosynthesis
(d) Respiration		
  - (v) Ribose is a Pentose sugar found in:
 

(a) NAD	(b) FAD	(c) RNA	(d) All of there
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  - (vi) A nucleotide base not present in DNA is:
 

(a) Adenine	(b) Guanine	(c) Uracil	(d) Thymine
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  - (vii) The Most abundant Monosaccharide in nature is:
 

(a) Lactose	(b) Glucose
(c) Maltose	(d) Sucrose
  - (viii) Cellulose is made up of the molecules of is:
 

(a) Alpha glucose	(b) Beta glucose
(c) Both of the above	(d) None of these.
2. Describe different steps of Nitrogen Cycle.
3. Describe light reaction of Photosynthesis
4. Describe the mechanism of opening and closing of stomata.
5. Describe Glycolytic Pathway in detail.
6. Give an account of Phytochrome system. How it supports initiation of flowering?
7. What are trace elements? What role do this play in the Physiology of plants?
8. What are Enzymes? Describe different kinds of Enzymes found in plants.
9. Give an account of the mechanism of geotropism.
10. Write notes on any two of the following:
 

(a) Imbibition	(b) Chemotropism
(c) Kinetics of Enzyme action	
(d) Electron transport system or Carrier concept of ion uptake in plant cells.	



**Programme of B.Sc. Part-III Botany (Hons.)**  
**Annual Practical Counselling & Practical Examination - 2022**  
 Venue : 1st Floor Biology Lab, Biscomaun Tower, Patna - 800 001

**(A) Practical Counselling Botany**

Date	Time	Paper
22.01.2023	09.00 AM to 05.30 PM	V to VIII

**(B) Practical Examination Botany**

Date	Time	Paper
23.01.2023	09.00 AM to 11.00 AM	V
	11.00 AM to 01.00 PM	VI
25.01.2023	09.00 AM to 11.00 AM	VII
	11.00 AM to 01.00 PM	VIII

**Nalanda Open University**  
**Annual Examination - 2022**  
**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) Yellowness of Tajmahal is an effect of:
    - (a) Acid rain
    - (b) Allergens
    - (c) Ozone depletion
    - (d) None of the above
  - (ii) Which of the following gas is present in the air in maximum amount?:
    - (a) Nitrogen
    - (b) Oxygen
    - (c) Carbon dioxide
    - (d) Methane.
  - (iii) The Ozone layer is present in:
    - (a) Mesosphere
    - (b) Thermosphere
    - (c) Stratosphere
    - (d) None of these
  - (iv) On which day the world environment day is celebrated?:
    - (a) 5th April
    - (b) 15th May
    - (c) 5th June
    - (d) 25th April
  - (v) Which is the main factor of water pollution?
    - (a) Smoke
    - (b) Industrial waste
    - (c) Detergents
    - (d) Ammonia
  - (vi) Which of the following is the first trophic level: in the food chain:
    - (a) Herbivores
    - (b) Carnivores
    - (c) Green plants
    - (d) All of the above
  - (vii) The upper part of aquatic ecosystem contains:
    - (a) Nekton
    - (b) Plankton
    - (c) Benthos
    - (d) Both (a) and (b)
  - (viii) The basic component of smog may be :
    - (a) Ozone
    - (b) PAN
    - (c) Ozone and PAN
    - (d) PPN and PBN
2. Define ecosystem? Describe various components of ecosystem with suitable examples.
3. What do you understand by the term ecological succession? Describe ecological succession in virgin pond.
4. Describe, how a hydrophytic plant adapt to live in water habitat?
5. What is ecological pyramid? Describe
  - (a) Food chain in grassland
  - (b) Food chain in a pond
6. Write an essay on water pollution? Describe ill effects of water pollution.
7. Describe different categories of natural resources.
8. What do you mean by conservation of biodiversity? Describe methods adopted for conservation of biodiversity.
9. Explain briefly
  - (a) Agroforestry and its significance
  - (b) Social forestry and its significance
10. Write short notes on any **two** of the following:
  - (a) Plant indicator
  - (b) Significance of protected area
  - (c) Greenhouse gases
  - (d) Acid rain
  - (e) Chipko movement
  - (f) non-conventional energy



**Programme of B.Sc. Part-III Botany (Hons.)**  
**Annual Practical Counselling & Practical Examination - 2022**  
 Venue : 1st Floor Biology Lab, Biscomaun Tower, Patna - 800 001  
**(C) Practical Counselling Botany**

Date	Time	Paper
<b>22.01.2023</b>	09.00 AM to 05.30 PM	V to VIII

**(D) Practical Examination Botany**

Date	Time	Paper
<b>23.01.2023</b>	09.00 AM to 11.00 AM	V
	11.00 AM to 01.00 PM	VI
<b>25.01.2023</b>	09.00 AM to 11.00 AM	VII
	11.00 AM to 01.00 PM	VIII

**Nalanda Open University**  
**Annual Examination - 2022**  
**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) Which of the following does in gene expression?:  
 (a) Transcription (b) RNA processing (c) Replication (d) Translation
  - (ii) During DNA cloning which of the following is not a crucial requirement:  
 (a) Protein expression (b) Vector  
 (c) Molecular cutter (d) DNA inserts
  - (iii) Non-coding sequence in mRNA is known as----- :  
 (a) Template (b) Non-Template  
 (c) Intron (d) Exon
  - (iv) The structural element of chromatin is:  
 (a) Histone (b) Acid protein and DNA  
 (c) Nuclear matrix (d) Nucleosome
  - (v) Which of the following has clover leaf shape:  
 (a) mRNA (b) rRNA  
 (c) tRNA (d) Sn RNA
  - (vi) Thylakoids occur inside:  
 (a) Mitochondria (b) Chloroplast  
 (c) Golgi apparatus (d) Endoplasmic reticulum
  - (vii) Haemophilia is due to:  
 (a) X Chromosome (b) Y Chromosome  
 (c) Both X and Y Chromosome (d) None of the above
  - (viii) A cell organelle that is exceptionally rich in hydrolytic enzymes is:  
 (a) Ribosomes (b) Lysosomes (c) Endoplasmic reticulum  
 (d) Mitochondria
2. Describe different types of RNA. Mention its role in function of the cell.
3. Describe different stages of Mitosis.
4. Cite one example to explain interaction of Gene.
5. What is linkage, give one suitable example to explain Linkage.
6. Describe different steps of Replication of DNA
7. Describe the Ultrastructure of Chromosome.
8. Describe various methods adopted in plant breeding.
9. How can you prove that DNA is the genetic material?
10. Write short notes on
  - (a) Types of Histone Protein (b) Idiogram
  - (c) Heterochromatin and Euchromatin (d) Regulator gene



**Programme of B.Sc. Part-III Botany (Hons.)**  
**Annual Practical Counselling & Practical Examination - 2022**  
 Venue : 1st Floor Biology Lab, Biscomaun Tower, Patna - 800 001

**(A) Practical Counselling Botany**

Date	Time	Paper
22.01.2023	09.00 AM to 05.30 PM	V to VIII

**(B) Practical Examination Botany**

Date	Time	Paper
23.01.2023	09.00 AM to 11.00 AM	V
	11.00 AM to 01.00 PM	VI
25.01.2023	09.00 AM to 11.00 AM	VII
	11.00 AM to 01.00 PM	VIII

# Nalanda Open University

Annual Examination - 2022

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:
  - Which of the following technique is used forensic scientist in detection of crime:
    - DNA fingerprinting
    - DNA sequencing
    - DNA nicking
    - Gene therapy
  - A trisomic individual has a chromosome number of :
    - 2N-1
    - 2N+2
    - 2N+1
    - 2N+3
  - The term anticodon is related to:
    - DNA
    - mRNA
    - tRNA
    - rRNA.
  - Cross between hererozygous individual and homozygous recessive parents is called:
    - Monohybrid cross
    - Dihybrid cross
    - Back cross
    - Test cross.
  - Turner syndrome is due to:
    - Monosomy
    - Nullisomy
    - Trisomy
    - Tetrasomy
  - Restriction enzymes are found in:
    - Viruses
    - Amoeba
    - Bacteria
    - Liver cells
  - The term allele was proposed by:
    - Bateson
    - Punnet
    - Mendel
    - Johannsen
  - Proteins are synthesized by:
    - Ribosome
    - Mitochondria
    - Gogibodies
    - Cetrosomes
- Write about Lethal genes, how Lethal factor modify Monohybrid cross.
- Explain polyploidy, what are the types of polyploidy? How polyploidy can be useful?
- Describe the mechanism of Polymerase chain reaction. What is its use.
- Write short notes on any **two** of the following:
  - Wobble hypothesis
  - Gene therapy
  - Genetically modified food
  - in situ germplasm conservation
- Write short notes on any two of the following:
  - Mean
  - Median
  - Mode
  - Standard deviation
- Define interaction of gene. Give one example to prove interaction of gene.
- What are vectors? Name vectors used in recombinant DNA technique.
- What is genetic engineering? Explain different application of genetic engineering for human welfare.
- What is genetic code? Describe the characteristics of genetic code.



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

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