

NALANDA OPEN UNIVERSITY

**M.Sc. Zoology, Part-I
PAPER-I**

(Non-Chordates and Chordates)

Annual Examination, 2020

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 hydrostatic movement in Coelenterates.
2. Give an account of filter-feeding in Polychaeta.
3. What is Coelom ? Describe organization of Coelom in Annelida.
4. Describe organ of respiration in Prawn.
5. Write notes on any two of the following :
 - (a) Medusa of obelia colony
 - (b) Trochophore larva
 - (c) Nephridia
 - (d) Bipinaria larva

GROUP 'B'

6. Describe the brain of Amphibia and compare it with that of mammals.
7. Describe the different components of Blood.
8. Describe the different types of feather found in birds.
9. Describe structure and affinities of Balanoglossus.
10. Write notes on any two of the following:
 - (a) Ctenoid scale
 - (b) Wheel organ
 - (c) Adeptive radiction
 - (d) Sebaceous gland

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-I

PAPER-II

(Taxonomy, Biodiversity and Conservation)

Annual Examination, 2020

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 is the rule of Zoological nomenclature ? Write a short note on international code of zoological nomenclature.
2. Describe the major features of biosphere reserves and their significance.
3. Describe different types of biodiversity.
4. Describe the process of typification.
5. Write notes on any two of the following :—
 - (a) Population Systematic
 - (b) Genetic Diversity
 - (c) Zoological types
 - (d) Cytotaxonomy and Molecular taxonomy

GROUP 'B'

6. What do you mean by wild-life ? How does it help in the maintenance of environment.
7. Describe the characteristics features of faunal adaptation of marine biome.
8. Give an account of various theories of biodiversity variation.
9. Give different reasons that tropical forests are vital to the World's ecosystem.
10. Write notes on any **Two** of the following :—
 - (a) Core Zone
 - (b) Census of threatened species
 - (c) Captive breeding
 - (d) Benthos

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NALANDA OPEN UNIVERSITY
M.Sc. Zoology, Part-I
PAPER—III
(Ecology, Environmental Biology and Toxicology)
Annual Examination, 2020

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. Discuss niche Concept with Special reference to its ecological significance.
2. Describe different categories of mutualism. How mutualism is evolved in nature ?
3. Describe the role of predation in nature.
4. What is Ecological Model ? Discuss the fundamentals of ecological model.
5. Write notes on any **Two** of the following:—
 - (a) Net productive rate
 - (b) Competition
 - (c) Intertidal zone
 - (d) Deciduous forest

GROUP 'B'

6. Explain how animals are adapted with the change in environment.
7. How do human interfere with carbon cycle.
8. Discuss the environmental stress on animals.
9. Describe the role of light and pressure on the survival of organism.
10. Write notes on any **Two** of the following:—
 - (a) Acclimatization
 - (b) Oxygen toxicity
 - (c) Acid rain
 - (d) Estuaries

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-I

PAPER-IV

(Ethology and Evolution)

Annual Examination, 2020

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 social organization of insects, giving example of honeybees.
2. Define learning and give an account of types of learning.
3. What do you mean by Parental Care ? Describe parental care in Amphibians.
4. Describe the types of signals and their role in communication among animals.
5. Write notes on any **Two** of the following:—
 - (a) Intra Sexual Selection
 - (b) Diapause
 - (c) Circardial Rhythm
 - (d) Navigation

GROUP 'B'

6. What do you mean by isolation and also discuss isolating mechanism.
7. Write an essay on macro and micro evolution.
8. Describe the "Hardy Weinberg Law" of genetic equilibrium.
9. Write an essay on lamarkism.
10. Write notes on any **Two** of the following:—
 - (a) Species concept
 - (b) Reproductive variation
 - (c) Lethal mutation
 - (d) Phenotype

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M.Sc. Zoology, Part-I

PAPER-V

(Biochemistry)

Annual Examination, 2020

Time: 3 Hours.

Full Marks: 80

Answer any Five Questions. All Questions carry equal marks.

1. Give an account of biological role of plasma lipoprotein.
2. Describe the structure and function of different proteins.
3. Give an account of significance of active transport.
4. Describe the oxidation of unsaturated fatty acid.
5. Give an account of the concept of metabolic pool.
6. Write an essay on Glycolysis.
7. Write notes on :—
 - (a) Hypoglycemia
 - (b) Facilitated diffusion
8. Discuss about the hexose monophosphate shunt pathway.
9. Describe the events in initiation and elongation of peptide chain in eukaryotes.
10. Write notes on any **Two** of the following:—
 - (a) Ribozyme
 - (b) Na⁺K⁺ pump
 - (c) Enzyme transformation.
 - (d) Catalytic activity of enzyme

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-I

PAPER-VI

(Cytogenetics and Microbial Genetics)

Annual Examination, 2020

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 characterization of human chromosome on the basis of different banding technique.
- Describe structural and functional organization lambrus chromosome.
- Describe the methods of heterokaryon selection.
- Describe the sex-chromosome abnormalities of human being and also mention its syndromes.
- Write notes on any two of the following :—
 - Nucleosome organization
 - Polytene chromosome
 - Radiation hybrid
 - Squash preparation

GROUP 'B'

- Describe the physical mapping of chromosome.
- Give an account of finger printing technique of DNA and its application.
- Describe the genetic regulation of cell cycle in eukaryotes.
- Describe the separation of chromosome by flow cytometer.
- Write notes on any **Two** of the following :—
 - Bacterial genome
 - Turner's Syndrome
 - F-factor
 - Bacterial genome

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M.Sc. ZOOLOGY, PART-I

Revised Practical Examination Programme, 2020

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

Enrollment No.	Batch	Enrollment No.	Batch
All Old students & 190270001-190270057	Z1	190270058-190270140	Z2
190270141-190270233	Z3	190270234-190270348	Z4
190270349-190270447	Z5	190270448-190270545	Z6
190270546-190270676	Z7	190270677-190270795	Z8
190270796-190270954	Z9		

Practical Examination Programme

Date	Time					
	08:00 AM to 11:00 AM		11:00 AM to 02:00 PM		02:00 PM to 05:00 PM	
	Batch	Paper	Batch	Paper	Batch	Paper
01.09.2021	Z1	I	Z1	II	Z1	III
02.09.2021	Z1	IV	Z1	V	Z1	VI
03.09.2021	Z1	VII	Z1	VIII	Z2	I
04.09.2021	Z2	II	Z2	III	Z2	IV
06.09.2021	Z2	V	Z2	VI	Z2	VII
07.09.2021	Z2	VIII	Z3	I	Z3	II
08.09.2021	Z3	III	Z3	IV	Z3	V
09.09.2021	Z3	VI	Z3	VII	Z3	VIII
10.09.2021	Z4	I	Z4	II	Z4	III
11.09.2021	Z4	IV	Z4	V	Z4	VI
13.09.2021	Z4	VII	Z4	VIII	Z5	I
14.09.2021	Z5	II	Z5	III	Z5	IV
15.09.2021	Z5	V	Z5	VI	Z5	VII
16.09.2021	Z5	VIII	Z6	I	Z6	II
18.09.2021	Z6	III	Z6	IV	Z6	V
20.09.2021	Z6	VI	Z6	VII	Z6	VIII
21.09.2021	Z7	I	Z7	II	Z7	III
22.09.2021	Z7	IV	Z7	V	Z7	VI
23.09.2021	Z7	VII	Z7	VIII	Z8	I
24.09.2021	Z8	II	Z8	III	Z8	IV
25.09.2021	Z8	V	Z8	VI	Z8	VII
27.09.2021	Z8	VIII	Z9	I	Z9	II
29.09.2021	Z9	III	Z9	IV	Z9	V
30.09.2021	Z9	VI	Z9	VII	Z9	VIII

NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-I PAPER-VII

(Molecular Biology and Genetics)

Annual Examination, 2020

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 promoter sites for initiation of Prokaryotes and Eukaryotes.
2. Describe the two classical experiments which demonstrated the semi conservative mode of DNA replication.
3. Describe the process of splicing.
4. What is molecular biology ? Discuss the important scopes for humans.
5. Write notes on any **Two** of the following:—

(a) Enhancer site	(b) Sigma factor
(c) RNA editing	(d) Elongation factor

GROUP 'B'

6. Describe translation process in Prokaryotes.
7. Describe the mechanism of DNA repair.
8. Describe the process of gene cloning.
9. Describe the recombination of Protein in E.Coli
10. Write notes on any **Two** of the following:—

(a) Gene Conversion	(b) Translation
(c) AFLP	(d) Reverse Transcription

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M.Sc. ZOOLOGY, PART-I

Revised Practical Examination Programme, 2020

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

Enrollment No.	Batch	Enrollment No.	Batch
All Old students & 190270001-190270057	Z1	190270058-190270140	Z2
190270141-190270233	Z3	190270234-190270348	Z4
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190270546-190270676	Z7	190270677-190270795	Z8
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Practical Examination Programme

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07.09.2021	Z2	VIII	Z3	I	Z3	II
08.09.2021	Z3	III	Z3	IV	Z3	V
09.09.2021	Z3	VI	Z3	VII	Z3	VIII
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14.09.2021	Z5	II	Z5	III	Z5	IV
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23.09.2021	Z7	VII	Z7	VIII	Z8	I
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30.09.2021	Z9	VI	Z9	VII	Z9	VIII

NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-I PAPER-VIII

(Basic physiology and chemical principles and instrumentation)

Annual Examination, 2020

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 process of electron transport and release of energy.
2. What is free energy ? Describe its role in bio-chemical reactions.
3. Give detailed account of prospects of Biochemical engineering.
4. Discuss the third law of thermodynamics.
5. Write notes on any **Two** of the following:—
 - (a) HMP-Shunt
 - (b) Energy rich bonds
 - (c) ATP
 - (d) P_H scale

GROUP 'B'

6. Give an account of different types of Electrophoresis.
7. Give an account of thin layer chromatography.
8. Discuss the different components of HPCL.
9. Discuss in detail Photosensitization.
10. Write notes on any **Two** of the following:—
 - (a) X-Ray
 - (b) Indicator
 - (c) ESR
 - (d) TLC

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M.Sc. ZOOLOGY, PART-I
Revised Practical Examination Programme, 2020
Venue : Zoology Lab, 1st Floor, Biscomaun Tower, Patna

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All Old students & 190270001-190270057	Z1	190270058-190270140	Z2
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Practical Examination Programme

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29.09.2021	Z9	III	Z9	IV	Z9	V
30.09.2021	Z9	VI	Z9	VII	Z9	VIII

NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-II

PAPER-IX

(Quantitative Biology and Microbiology)

Annual Examination, 2020

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. Define and explain harmonic and geometric mean with examples.
2. Discuss the assumption for analysis of variance.
3. Define probability distribution. Explain different types of probability distribution.
4. Describe different types of regression with examples.
5. Write notes on any **Two** of the following:—
 - (a) Partial correlation
 - (b) Degree of freedom
 - (c) Level of significance
 - (d) Correction coefficient

GROUP 'B'

6. Give an account of bacterial microbes and also discuss diseases related to them.
7. Give an account of elementary ideas of Bio-statics.
8. Describe the structure, Pathogenesis of mode of HIV infection.
9. What do you mean by bio-informatics ?
10. Write notes on any **Two** of the following:—
 - (a) Industrial microbiology
 - (b) Symptoms of AIDS
 - (c) Single cell protein
 - (d) Antibodies

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-II

PAPER-X

(Biotechnology)

Annual Examination, 2020

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. Explain the Southern blotting in detail.
2. Give an account of colorimeter and its applications.
3. Raman's spectroscopy in good scientific "Research tool" Justify your answer in detail.
4. Explain the procedure and advantages of fluorescence method by DNA assay.
5. Write notes on any **Two** of the following:—
 - (a) Radiation detecting devices
 - (b) Stage scanning and beam scanning
 - (c) Fluorescence resonance energy Transfer
 - (d) HIV Virus

GROUP 'B'

6. What is biosensor ? Explain any type of biosensor of your choice.
7. What do you understand by transmission electron microscopy ? Describe its structure and function.
8. Discuss the basic features of HPLC with its application.
9. Give an account of permanent histological slide preparation.
10. Write notes on any **Two** of the following:—
 - (a) Labelling of antibodies
 - (b) Nuclear and plasma stains
 - (c) Immunosensor
 - (d) TLC

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-II

PAPER–XI

(Immunology, Cell & Tissue)

Annual Examination, 2020

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 a general properties of Antigen.
2. Give a detailed account of acquired immune response.
3. Give a detailed account of structure of MHC molecule.
4. What are secondary lymphoid organs ? Write a brief account of each of them.
5. Write notes on any **Two** of the following:—
 - (a) Natural Killer Cells
 - (b) Macrophase
 - (c) Atopy
 - (d) Mismatched transfunction

GROUP 'B'

6. How micro filament and microtubule play their role in Cytoskeleton ?
7. Give an account of the fluid mosaic model of the Cell membrane.
8. Describe cell movement and intracellular transport.
9. Describe the structure, composition and distribution of Apoprotein.
10. Write notes on any **Two** of the following:—
 - (a) Microvilli
 - (b) Radial Spokes
 - (c) Peripheral protein
 - (d) Cyclosis

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-II

PAPER–XII

(Parasitology)

Annual Examination, 2020

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 life history and Pathogenic effect of *Wuchereria bancrofti*.
2. Describe the role of Antigen-Antibody relation in clinical Parasitology.
3. What do you mean by Vector ? Describe the importance in transmission of Parasites.
4. Differentiate between innate and adoptive immunity.
5. Write notes on any **Two** of the following:—
 - (a) Encystment
 - (b) T-lymphocytes
 - (c) Filariasis
 - (d) Trophozoid stage

GROUP 'B'

6. Describe the various classes of Antibodies and their biological activities.
7. Discuss Poultry diseases and also their general prevention and control.
8. Describe the different types of ELISA and their application.
9. Write about lymph nodes in the context of immune system.
10. Write notes on any **Two** of the following:—
 - (a) Natural killer cell
 - (b) Immunoblot
 - (c) Liverfluke
 - (d) Bone marrow

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-II

PAPER–XIII

(Developmental Biology)

Annual Examination, 2020

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 structure of matured mammalian gametes.
2. What do you mean by Vitellogenesis ? Discuss in detail.
3. What is fertilization ? Describe the mechanism of fertilization.
4. Describe the process of gastrulation.
5. Write notes on any **Two** of the following:—
 - (a) Neurulation
 - (b) Ovulation
 - (c) Graffin follicles
 - (d) Balstula formation

GROUP 'B'

6. Give an account of role of ecdysone in insects metamorphosis.
7. Define metamorphosis ? Discuss the physiological and biological metamorphic changes in Amphibians.
8. Describe the method of bone marrow transplantation.
9. Describe the significance of totipotency and pluripotency of cell during animal development.
10. Write notes on any **Two** of the following:—
 - (a) External fertilization
 - (b) Adult-Stem cell
 - (c) Yolk placenta
 - (d) Ecological metamorphosis.

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-II

PAPER-XIV

(Endocrinology)

Annual Examination, 2020

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 Cortical hormones secreted by adrenal gland and its physiological effects.
2. Describe the chemistry and physiological action of Glucagon.
3. Describe structure of Pituitary gland and discuss the functions of different hormones secreted by the gland.
4. Describe the bio-synthesis and functions of Thyroxin.
5. Write notes on any **Two** of the following:—
 - (a) Thyrocalcitonin
 - (b) Acromegaly
 - (c) Oxytocin
 - (d) STH

GROUP 'B'

6. Describe the histology of ovary and functions of ovarian hormones.
7. Describe the role of hormone in Metabolism.
8. Describe endocrine functions of Testis.
9. Describe the process of spermatogenesis and write a note on mammalian sperm.
10. Write notes on any **Two** of the following:—
 - (a) Addison's disease
 - (b) Gastrin
 - (c) Nor-adrenalin
 - (d) Mineralo-corticoides

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-II

PAPER—XV

(Applied Entomology)

Annual Examination, 2020

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 respiration in terrestrial insects.
2. Describe male and female reproductive organs in insects.
3. Describe the mouth parts of insects and write a note on their mechanism of feeding.
4. Describe the structure, Composition and functions of cuticle in insects.
5. Write notes on any **Two** of the following:—
 - (a) Spiracles
 - (b) Pheromon
 - (c) Chemoreceptor
 - (d) Hermaphroditism

GROUP 'B'

6. Describe methods of estimation of pest population.
7. Describe the life-cycle of two pests of cereal and their control.
8. Write an essay on "Insect-host plant interaction."
9. describe the role of chemicals in the pest management.
10. Write notes on any **Two** of the following:—
 - (a) Carbamates
 - (b) Migrant pest
 - (c) Viviparity
 - (d) Pest of Oilseed crops

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NALANDA OPEN UNIVERSITY

M.Sc. Zoology, Part-II
PAPER–XVI

(Ichthyology and Inland Fisheries)

Annual Examination, 2020

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 structure and functions of Weberian Ossicles.
2. Justify the statement that Gastrointestinal tracts of fishes are modified to their food and feeding habits.
3. Describe the aquatic resources in reference to riverine fishes of India.
4. Describe the air breathing organs of Catfish *Heteropneustes fossilis*.
5. Write notes on any **Two** of the following:—
 - (a) Mucus gland
 - (b) Gonadosomatic index
 - (c) Cloroid cell
 - (d) Air Sac

GROUP 'B'

6. Describe induced breeding and add a note on the factors influencing it.
7. What are the objective of fish culture ? Describe fish culture in fresh water.
8. Describe different crafts and gear used in fish capture in marine water.
9. Give an account of Protozoan and fungal diseases in fishes and their cure.
10. Write notes on any **Two** of the following:—
 - (a) Long drag net
 - (b) Fate of Prawn culture in India
 - (c) Oceanography
 - (d) Exotic carps

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