

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-I, PAPER-I
(Non-Chordates and Chordates)
Annual Examination, 2014

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 filter feeding mechanism in Mollusca.
2. Describe the mechanism of respiration in lower organisms.
3. Give an account of organs of excretion in Annelida.
4. Describe the hydrostatic movement in Coelenterates.
5. Write short notes on any **Two** of the following :—
 - (a) Acoelomates
 - (b) Bipinnaria larva
 - (c) Tracheal system
 - (d) Hepatopancrease

GROUP-B

6. Classify living reptiles upto class with important characters and example.
7. Describe types of epidermal glands found in vertebrates.
8. Compare brain of amphibia with that of mammal.
9. Give an account of heart of reptile and mammal.
10. Write short notes on any two of the following:
 - (a) Placoid scale
 - (b) Tadpole larva
 - (c) Wheel organ.
 - (d) Duck-bill platypus.

* * *

Examination Programme, 2014
M.Sc. Zoology, Part-I

Date	Paper	Time	Examination Centre
05.07.2014	Paper-I	3.30 PM to 6.30 PM	D.A.V. Public School, Cantt Road, Khagaul, Patna
07.07.2014	Paper-II	3.30 PM to 6.30 PM	D.A.V. Public School, Cantt Road, Khagaul, Patna
09.07.2014	Paper-III	3.30 PM to 6.30 PM	D.A.V. Public School, Cantt Road, Khagaul, Patna
11.07.2014	Paper-IV	3.30 PM to 6.30 PM	D.A.V. Public School, Cantt Road, Khagaul, Patna
15.07.2014	Paper-V	3.30 PM to 6.30 PM	D.A.V. Public School, Cantt Road, Khagaul, Patna
17.07.2014	Paper-VI	3.30 PM to 6.30 PM	D.A.V. Public School, Cantt Road, Khagaul, Patna
19.07.2014	Paper-VII	3.30 PM to 6.30 PM	D.A.V. Public School, Cantt Road, Khagaul, Patna
21.07.2014	Paper-VIII	3.30 PM to 6.30 PM	D.A.V. Public School, Cantt Road, Khagaul, Patna

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-I, PAPER-II
(Taxonomy, Biodiversity and conservation)
Annual Examination, 2014

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 typification.
2. Give an account of different kinds of taxonomic keys.
3. Describe the application of biosystematics in biology.
4. Give an account of theories of biological classification.
5. Write short notes on any **Two** of the following:—
 - (a) Genetic diversity
 - (b) Intra specific species
 - (c) Zoological types
 - (d) ICZN

GROUP-B

6. Give an account of threatened and endangered species.
7. Give reasons for depletion of wild life in India.
8. Give an account of direct and indirect census technique.
9. Describe the characteristic features and faunal adaptation of marine biome.
10. Write short notes on any two of the following:
 - (a) N.G.O.
 - (b) Pug marking
 - (c) Taxon
 - (d) Dolphin

* * *

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-I, PAPER-III
(Ecology, Environmental Biology and Toxicology)
Annual Examination, 2014

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 different types of competition found in nature.
2. Describe role of predation in nature.
3. Describe the significance of age distribution. What are the possibilities of developing stable age distribution.
4. Discuss different types and various hypothesis put forward to explain sexual selection.
5. Write short notes on any **Two** of the following:—
 - (a) Life table
 - (b) Niche concept
 - (c) Ecological model
 - (d) Generation time.

GROUP-B

6. Describe the role of water quality in environmental health.
7. Describe the impact of temperature on various life processes.
8. Explain how animals are adapted with the change of environment.
9. Describe the physiology of oxygen deficiency in animals.
10. Write short notes on any two of the following:
 - (a) Solar energy
 - (b) Acclimatiosation
 - (c) Oxygen toxicity
 - (d) Acid rain

* * *

NALANDA OPEN UNIVERSITY

M.Sc. Zoology

PART-I, PAPER-IV

(Ethology and Evolution)

Annual Examination, 2014

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. Write an essay on bird migration.
2. Give an account of parental care in fishes.
3. Give an account of habitat selection and mention the factors associated with habitat selection.
4. Describe the types and role of signals in communication in animals.
5. Write short notes on any **Two** of the following:—
 - (a) Biological clock
 - (b) Navigation
 - (c) Innate behaviour
 - (d) Cognitive skills

GROUP-B

6. Give an account of Lamarckism.
7. Give an account of destabilizing forces of Neo-Darwinism.
8. Describe models explaining changes in genetic structure of population.
9. Describe models explaining changes in genetic structure of population.
10. Write short notes on any two of the following:
 - (a) Gene-Pool
 - (b) Phylogenetic tree
 - (c) Reproductive isolation
 - (d) Phynotypic variation

*** * ***

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-I, PAPER-V
(Animal Physiology and Biochemistry)
Annual Examination, 2014

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 muscle Contraction.
2. Describe the physiological adaption of marine animals.
3. Give an account of audio signal in animals.
4. Describe the physiology of respiration in mammal.
5. Write short notes on any **Two** of the following:—
 - (a) Pheromone
 - (b) Bohr's Effect
 - (c) Oceanic Zone
 - (d) Mytilaments

GROUP-B

6. Describe citrice acid cycle and its energetics.
7. Give a brief account of biological role of plasma lipoproteins.
8. Describe the short term and long term regulation of fatty acid synthesis.
9. Describe the events in the initiation and elongation of peptide chains in eukaryotes.
10. Write short notes on any two of the following:
 - (a) Riboenzyme
 - (b) Lipotrpc factors
 - (c) Rate limiting enzyme
 - (d) Energenitic of Glycolysis

* * *

<p><i>For Practical Counselling Class & Practical Examination Programme Please See on Back Page.</i></p>

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-I, PAPER-VI
(Cytogenetics and Microbial Genetics)
Annual Examination, 2014

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 structural and functional organization of polytene chromosome.
2. Describe the sex-chromosome abnormalities of human being and also mention its syndrome.
3. Describe the characterization of human chromosome on the basis of different banding technique.
4. Write an essay on cell harvesting.
5. Write short notes on any **Two** of the following:—
 - (a) Band numbering
 - (b) Non-disjunction
 - (c) Nucleosome organization
 - (d) Lampbrush chromosome

GROUP-B

6. Give an account of finger printing technique of DNA and its application.
7. Describe the genetic regulation of cell cycle in eukaryotes.
8. Describe the cytogenetic effects of ionizing and non-ionizing radiations.
9. Give an account of principle and application of Flow cytometry.
10. Write short notes on any two of the following:
 - (a) Hfr bacteria
 - (b) T4 -phage
 - (c) FISH
 - (d) Bacterial genome.

* * *

<p><i>For Practical Counselling Class & Practical Examination Programme Please See on Back Page.</i></p>

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-I, PAPER-VII
(Molecular Biology and Genetics)
Annual Examination, 2014

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 history of molecular biology.
2. Give two classical experiments to demonstrate semi-conservative mode of DNA replication.
3. Describe the process and regulation export of m RNA.
4. Describe the promoter sites for initiation of transcription in prokaryotes.
5. Write short notes on any **Two** of the following:—
 - (a) TATA Box
 - (b) Enhancer Sites
 - (c) Theta configuration
 - (d) Template

GROUP-B

6. Describe mechanism of DNA repair.
7. Describe translation process in prokaryotes.
8. How will you show that the minimum size of a code word should be triplet?
9. Describe the recombination of protein in E.Coli.
10. Write short notes on any two of the following:
 - (a) RELF
 - (b) Libraries
 - (c) Gene conversion
 - (d) Teminism

* * *

<p><i>For Practical Counselling Class & Practical Examination Programme Please See on Back Page.</i></p>

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-I, PAPER-VIII
(Basic Physical and Chemical Principles and Instrumentation)
Annual Examination, 2014

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 how biological energy transducers play an important role in all living organisms.
2. Describe Glycolysis and its energetics.
3. Give an account of effect of radiation in biological system.
4. Give an account of hydrogen bond. Describe its significance in biological system.
5. Write short notes on any **Two** of the following:—
 - (a) Energy-Rich bonds
 - (b) ATP
 - (c) Entropy
 - (d) HMP Shunt

GROUP-B

6. Describe the principle and Working of Colorimeter.
7. Give an account of Thin Layer Chromatography (TLC)
8. Describe the mechanism of Photometer.
9. Define different types of ultracentrifuge techniques.
10. Write short notes on any **Two** of the following:
 - (a) X-ray
 - (b) Sedimentation
 - (c) Indicators
 - (d) Buffer

* * *

<p><i>For Practical Counselling Class & Practical Examination Programme Please See on Back Page.</i></p>

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-II, PAPER-IX
(Quantitative Biology & Microbiology)
Annual Examination, 2014

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 arithmetic mean and give its merits and demerits.
2. Define variance and standard deviation and describe their computations from ungrouped scores of a sample.
3. Define correlation coefficient. Describe different types of correlation.
4. Describe the different types of regression.
5. Write short notes on any **Two** of the following:—
 - (a) Skewness and Kurtosis
 - (b) Normal distribution
 - (c) Errors of inference
 - (d) Standard error

GROUP-B

6. Describe the structure, pathogenesis and mode of HIV infection.
7. Describe the role of microbes in improvement of soil and in dairy industry.
8. Write an essay on "Host-microbe interaction.
9. Give an account of the elementary ideas of bioinformatics.
10. Write short notes on any **Two** of the following:
 - (a) Homology and analogy
 - (b) Whooping cough
 - (c) Nitrogen fixation
 - (d) Alcoholic fermentation.

* * *

Examination Programme, 2014
M.Sc. Zoology, Part-II

Date	Paper	Time	Examination Centre
14.08.2014	Paper-IX	8.00 AM to 11.00 AM	Nalanda Open University, Patna
16.08.2014	Paper-X	8.00 AM to 11.00 AM	Nalanda Open University, Patna
20.08.2014	Paper-XI	8.00 AM to 11.00 AM	Nalanda Open University, Patna
22.08.2014	Paper-XII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
26.08.2014	Paper-XIII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
28.08.2014	Paper-XIV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
30.08.2014	Paper-XV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
01.09.2014	Paper-XVI	8.00 AM to 11.00 AM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY

M.Sc. Zoology PART-II, PAPER-X (Biotechnology) Annual Examination, 2014

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 Southern blotting technique. Give an account of major steps involved in isolation of a particular gene from a genome.
2. Describe the working and principle of Spectrophotometer and its two applications.
3. Describe the working of NMR Spectroscopy and where it can be used ?
4. Discuss principles and basis of Scanning electron microscopy.
5. Write short notes on any **Two** of the following:—
 - (a) Radioisotope
 - (b) RNA assay
 - (c) Radiation detecting devices
 - (d) Beta Decay

GROUP-B

6. What is fixation ? Give an account of nature of fixatives and properties of chemical fixing reagents.
7. Write an essay on RIA and its applications.
8. Describe basic feature of HPLC and its applications.
9. Describe comet assay technique for detection of apoptotic cells.
10. Write short notes on any **Two** of the following:
 - (a) Biosensor
 - (b) ELISA
 - (c) Labelling of antibodies
 - (d) SDS-PAGE

* * *

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-II, PAPER-XI
(Immunology, Cells and Tissues)
Annual Examination, 2014

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 innate immunity? Give a detail account of immunogenic innate response..
2. Give a detail account of structure of MHC molecules.
3. Give general properties of antigen.
4. Write an account of role played by the biological system in immunogenicity.
5. Write short notes on any **Two** of the following:—
 - (a) Hapten
 - (b) Atopy
 - (c) Membrane attack complex
 - (d) Complement deficient diseases.

GROUP-B

6. Describe molecular organization of cell membrane.
7. How microfilament and microtubules play their role in cytoskeleton.
8. Describe the cell movement and intracellular transport.
9. Describe the basic mechanism of cell signalling.
10. Write short notes on any **Two** of the following:
 - (a) Dynein arm
 - (b) Radial spokes
 - (c) Sorting of protein
 - (d) DAG.

* * *

NALANDA OPEN UNIVERSITY

M.Sc. Zoology

PART-II, PAPER-XII

(Parasitology)

Annual Examination, 2014

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 effects of *Entamoeba histolytica*.
2. Describe the life history and pathogenic effect of *Wuchereria bancrofti*.
3. Describe the history, symptoms, pathogens and control of malaria.
4. Write an essay on vectors and their transmission of parasites.
5. Write short notes on any **Two** of the following:—
 - (a) Encystment
 - (b) Kala-azar
 - (c) Fleas
 - (d) Bed bug

GROUP-B

6. Give an account of prevention and control of poultry diseases.
7. Give an account of antigen and antibody reaction in clinical parasitology.
8. What do you mean by ELISA? Describe the types and application.
9. Describe other types of cells acting in immune system.
10. Write short notes on any **Two** of the following:
 - (a) Natural Killer cells
 - (b) Macrophages
 - (c) I g G
 - (d) Bone marrow

* * *

NALANDA OPEN UNIVERSITY

M.Sc. Zoology

PART-II, PAPER-XIII

(Developmental Biology)

Annual Examination, 2014

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 structure of mature mammalian gametes.
2. Describe the mechanism of capacitation of mammalian sperm in Vivo.
3. Describe the process of vitellogenesis.
4. Give an account of events that lead to differentiation of sperms and eggs during gametogenesis.
5. Write short notes on any **Two** of the following:—
 - (a) Graffin follicles
 - (b) Acrosome formation
 - (c) Telolecithal eggs
 - (d) Cleavage

GROUP-B

6. Describe role of ecdysone in insect metamorphosis.
7. Describe the method of bone marrow transplantation.
8. Give an account of cytoplasm and nucleus in cell differentiation.
9. Describe the pattern of cell movement during gastrulation in vertebrates.
10. Write short notes on any **Two** of the following:
 - (a) Stem Cells
 - (b) Blastulation
 - (c) Juvenile hormone
 - (d) Neurulation.

* * *

***For Practical Counselling Class & Practical Examination Programme
Please See on Back Page.***

NALANDA OPEN UNIVERSITY

M.Sc. Zoology
PART-II, PAPER-XIV
(Endocrinology)
Annual Examination, 2014

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 histology of pituitary gland and functions of hormones secreted by adenohypophysis.
2. Give an account of biosynthesis and function of thyroxin.
3. Describe the chemistry, source and physiological action of glucagon.
4. Describe the different diseases produced due to unbalance of different hormones.
5. Write short notes on any **Two** of the following:
 - (a) Oxytocin
 - (b) Hypothyroidism
 - (c) Calorigenesis
 - (d) Noradrenaline

GROUP-B

6. Describe the hormonal control of testosterone production.
7. Describe the mechanism of action of hormones.
8. Give an account of role of hormone in metabolism.
9. Describe the physiology of ovarian hormones.
10. Write short notes on any **Two** of the following:
 - (a) Ovulation
 - (b) Implantation
 - (c) Feedback
 - (d) Prostate gland

* * *

***For Practical Counselling Class & Practical Examination Programme
Please See on Back Page.***

NALANDA OPEN UNIVERSITY

M.Sc. Zoology
PART-II, PAPER-XV
(Entomology)
Annual Examination, 2014

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 genitalia in insects.
2. How the cuticle is formed ? Explain mechanism of moulting.
3. Give an account of sound producing organs in insects.
4. Describe respiration in terrestrial insects.
5. Write short notes on any **Two** of the following:
 - (a) Sucker feet.
 - (b) Chemoreceptors.
 - (c) Hermaphroditism.
 - (d) Air sacs.

GROUP-B

6. Write an essay on integrated pest management.
7. Describe the methods for estimation of pest population.
8. Describe the role of chemicals in insect pest management.
9. Describe the life cycle of any two pests of cereals and their control.
10. Write short notes on any **Two** of the following:
 - (a) Migrants pests.
 - (b) Pests of coffee.
 - (c) Parasitic insects.
 - (d) Mixed cropping.

* * *

<p><i>For Practical Counselling Class & Practical Examination Programme Please See on Back Page.</i></p>

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-II, PAPER-XVI
(Ichthyology and Inland fisheries)
Annual Examination, 2014

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 structure and functions of acoustico lateralis system in fishes.
2. Give an account of ecological status of marine water.
3. Describe the structure of gastrointestinal tract of a carnivore fish, *N. rupicola* and add a note on its feeding habit.
4. Define estuary and describe the estuarine fisheries of India.
5. Write short notes on any **Two** of the following:
 - (a) Brackish Water farms in India.
 - (b) Plankton feeders.
 - (c) Chondrichthyes.
 - (d) Gill Ventilation.

GROUP-B

6. Give an account of polyculture in India.
7. Describe artificial breeding in fishes.
8. Give an account of prawn culture in sea water in India.
9. Describe the fish diseases caused by virus and crustaceans and their treatment.
10. Write short notes on any **Two** of the following:
 - (a) Gear and Craft.
 - (b) Fish Liver Oil.
 - (c) Mahajal.
 - (d) Oceanography.

* * *

<p><i>For Practical Counselling Class & Practical Examination Programme Please See on Back Page.</i></p>
