

NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-I, PAPER-I
(Non-Chordates and Chordates)
Annual Examination, 2013

Time: 3 Hours.

Full Marks: 80

*Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.*

GROUP-A

1. Describe organization of coelom in Annelida.
2. Give an account of Ciliary and flagellar movement in Protozoa.
3. "Polychaetes are filter feeders" Discuss.
4. Give a brief account of evolutionary significance of different larval forms of invertebrates.
5. Write short notes on any **Two** of the following :—
 - (a) Pseudocoelomates
 - (b) Metamerism
 - (c) Nephridia
 - (d) respiratory pigments

GROUP-B

6. Describe structure and affinities of Balanoglossus.
7. Trace the evolution of aortic arches in vertebrates.
8. Classify amphibia upto orders giving distinguish characters and examples.
9. Give a comparative account of heart of ambhibia and bird.
10. Write short notes on any **Two** of the following :—
 - (a) Ctenoid Scale
 - (b) Echidina
 - (c) Sebaceous gland
 - (d) Contour feathers

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NALANDA OPEN UNIVERSITY
Annual Examination, 2013
M.Sc. Zoology
PART-I, PAPER-II
(Taxonomy, Biodiversity and conservation)

Time: 3 Hours.

Full Marks: 80

*Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.*

GROUP-A

1. Describe hierarchy of categories.
2. What is speciation? Describe the various category of species.
3. What is meant by Zoological types? Discuss different kinds of Zoological types.
4. Explain different types of biodiversity.
5. Write short notes on any two of the following:
 - (a) Species Concept
 - (b) Cytotaxonomy and molecular taxonomy
 - (c) Quarantine
 - (d) Magnitude of biodiversity

GROUP-B

6. Give an account of wild-life management in India.
7. Describe the various theories of biodiversity variation.
8. Describe the characteristics and adaptation of forest biome.
9. Give an account of the sample count, line transect method and pug marking.
10. Write short notes on any **Two** of the following:—
 - (a) Wild-life Act, 1972
 - (b) IUCN Red Data Book
 - (c) Captive breeding
 - (d) Benthos

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NALANDA OPEN UNIVERSITY
Annual Examination, 2013
M.Sc. Zoology
PART-I, PAPER-III
(Ecology, Environmental Biology and Toxicology)

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 different types of life tables with examples.
2. What is ecological model? Give a brief account of fundamentals of ecological model.
3. Give an account of niche concept with special reference to its ecological significance.
4. Give an account of evolution of life history traits.
5. Write short notes on any two of the following:
 - (a) Optimal foraging theory
 - (b) Mutualism
 - (c) Testing of model
 - (d) Predation

Group-B

6. What is adaptation? Describe different aspects of adaptation.
7. Give an account of environmental acts of India.
8. Describe the role of light and pressure on the survival of organisms.
9. Give an account of environmental stress on animals.
10. Write short notes on any two of the following:
 - (a) Mountain sickness
 - (b) Oxygen toxicity
 - (c) Acclimatisation
 - (d) Tolerance

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NALANDA OPEN UNIVERSITY
Annual Examination, 2013
M.Sc. Zoology
PART-I, PAPER-IV
(Ethology and Evolution)

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 learning and give an account of types of learning in detail.
2. Give an account of social organization of insect, citing an example of honeybee.
3. Describe parental care in Amphibia.
4. Describe the various aspects of fish migration.
5. Write short notes on any two of the following:
 - (a) Orientation
 - (b) Classical Learning
 - (c) Intersexual selection
 - (d) Diapause

Group-B

6. Define evolution and give an account of macro and microevolution.
7. Describe the "Hardy-Weinberg Law" of genetic equilibrium.
8. Explain briefly biological species concept and add a note on its limitation.
9. Give an account of isolating mechanism.
10. Write short notes on any two of the following:
 - (a) Darwinism
 - (b) Lamarckism
 - (c) Phylogenetic tree
 - (d) Phenotype

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NALANDA OPEN UNIVERSITY
Annual Examination, 2013
M.Sc. Zoology
PART-I, PAPER-V
(Animal Physiology and Biochemistry)

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 urine formation in mammal.
2. Describe the physiological adaptation of fresh water environment in animals.
3. Give an account transport of oxygen and carbondioxide in mammal.
4. Describe the physiological effect of temperature on homoeothermic animals.
5. Write short notes on any two of the following:
 - (a) Hibernation
 - (b) Benthic animals of fresh water
 - (c) Sarcomeres
 - (d) Ecdysone

Group-B

6. Describe structure and classification of carbohydrates.
7. Describe the steps of Glycolysis and its significance.
8. Give an account β -oxidation of fatty acid.
9. Give an account enzyme substrate reaction.
10. Write short notes on any two of the following:
 - (a) Riboengyme
 - (b) Operon concept
 - (c) Membrane transport
 - (d) HMP Shunt.

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NALANDA OPEN UNIVERSITY
Annual Examination, 2013
M.Sc. Zoology
PART-I, PAPER-VI
(Cytogenetic and Microbial Genetics)

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 lamp brush chromosome.
2. Describe methods of heterokaryon selection.
3. Describe the techniques in human chromosome analysis and molecular cytogenetic approaches.
4. Describe the banding number, banding nomenclature and classification of human karyotype.
5. Write short notes on any two of the following:
 - (a) Squash preparation
 - (b) Down's syndrome
 - (c) Cell harvesting
 - (d) Chromosomal puffs

Group-B

6. Describe the separation of chromosome by flow cytometry.
7. Describe the molecular basis of cellular checkpoint in which the cycle can be arrested.
8. How DNA is transferred from one bacterial cell to another by bacterial virus.
9. Describe the physical mapping of chromosomes.
10. Write short notes on any two of the following:
 - (a) F-factor
 - (b) Bacteriophages
 - (c) DNA finger printing
 - (d) Turner's syndrome

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NALANDA OPEN UNIVERSITY

Annual Examination, 2013

M.Sc. Zoology

PART-I, PAPER-VII

(Molecular Biology)

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 molecular biology ? Discuss its important scopes for humans.
2. Give an account of DNA replication in eukaryote.
3. Give an account of process of splicing.
4. Describe the process of RNA editing in reference to mitochondrial genome.
5. Write short notes on any two of the following:
 - (a) Replicons
 - (b) Unwinding proteins
 - (c) Sigma factor
 - (d) Antiterminators.

Group-B

6. Explain general properties of genetic code.
7. Describe Holliday model of genetic recombination.
8. Describe the procedure of gene cloning.
9. Describe the eukaryotic translation.
10. Write short notes on any two of the following:
 - (a) Elongation factor
 - (b) Chromosome map
 - (c) Minisatellites
 - (d) Peptidyl transferase

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NALANDA OPEN UNIVERSITY
Annual Examination, 2013
M.Sc. Zoology
PART-I, PAPER-VIII
(Basic, Physical and Chemical Principles and Instrumentation)

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 first law of thermodynamics ? Describe its limitation and justify the need of second law.
3. What are radioactive isotopes ? Discuss its uses in the treatment of diseases.
4. Describe different types of chemical bonds with special reference to bio-molecules.
5. Write short notes on any **Two** of the following :—
 - (a) HMP Shunt
 - (b) Buffers
 - (c) Redox Potential
 - (d) pH Scale

Group-B

6. Give an account of different components of HPLC.
7. What are the different types of Electrophoresis. Describe them on the basis of media prepared.
8. What are photochemical reactions ? How they differ from dark reaction ?
9. Give an account of Gas Liquid Chromatography and its uses.
10. Write short notes on any **Two** of the following :—
 - (a) ESR
 - (b) TLC
 - (c) Hydrogen Bond
 - (d) Limitation of pH Scale

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NALANDA OPEN UNIVERSITY
M.Sc. Zoology
PART-II, PAPER-IX
(Quantitative Biology and Microbiology)
Annual Examination, 2013

Time: 3 Hours.

Full Marks: 80

*Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.*

GROUP-A

1. Give an account of definition, classification and applications of Biostatistics.
2. Define harmonic and geometric mean and give its merits and demerits.
3. Describe the assumption for chi-square test. Mention important properties of chi-square.
4. Define probability distribution ? Explain different types of probability distribution ?
5. Write short notes on any **Two** of the following :—
 - (a) Null hypothesis
 - (b) Partial Correlation
 - (c) Regression
 - (d) Levels of significance

GROUP-B

6. Describe the protozoan microbes and its diseases
7. Give an account of bacterial microbes and related diseases.
8. Describe role played by microbes for the welfare of human beings.
9. Write an essay on "Bioinformatics"
10. Write short notes on any **Two** of the following :—
 - (a) Single cell protein
 - (b) Microbes in medicine
 - (c) Balantidium coli
 - (d) Symptoms of AIDS

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NALANDA OPEN UNIVERSITY

Annual Examination, 2013

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

Time: 3 Hours.

Full Marks: 80

***Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.***

GROUP-A

1. Give an account of steps involved in DNA amplification method for RNA assay and significance of RNA assay.
2. Discuss the significance of Northern blotting in the study of gene expression.
3. Write an essay on Colorimeter.
4. How Confocal microscope is used for stage scanning. Disk scanning and Bean scanning?
5. Write short notes on any **Two** of the following:—
 - (a) HIV virus
 - (b) Southern blot
 - (c) Radioactive decay
 - (d) Fluorescence Resonance Energy transfer (FRET)

GROUP-B

6. What is biosensor? Explain any one of biosensor and add a note on its nature.
7. Give an account of principle and application of flow cytometry.
8. Describe the labelling of antibodies.
9. What is immunoassay? Describe different methods used for immunoassay.
10. Write short notes on any **Two** of the following:—
 - (a) Fixation
 - (b) Staining
 - (c) Cytological fixatives
 - (d) TLC

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NALANDA OPEN UNIVERSITY
Annual Examination, 2013
M.Sc. Zoology
PART-II, PAPER-XI
(Immunology, Cells and Tissues)

Time: 3 Hours.

Full Marks: 80

*Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.*

GROUP-A

1. Give a detailed account of acquired immune response.
2. Define haptens? Discuss the role played by haptens.
2. Define hypersensitivity? Write the Comb's and Gell classification of hypersensitivity.
4. Give a detailed account of adjuvants and their properties
5. Write short notes on any **Two** of the following :—
 - (a) Natural killer cells
 - (b) Macrophage
 - (c) Mismatched transfusion
 - (d) Immunogenecity

GROUP-B

6. Give an account of fluidmosaic model of cell membrane.
7. Give an account of active transport across cell membrane.
8. Describe the structure, composition and distribution of Apoprotein.
9. Discuss the microtubules in the various forms of cell motility.
10. Write short notes on any **Two** of the following :—
 - (a) Adipose tissues
 - (b) Cyclosis
 - (c) AMP Kinase
 - (d) Vectorial function of Na K ATPase

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NALANDA OPEN UNIVERSITY

Annual Examination, 2013

M.Sc. Zoology PART-II, PAPER-XII (Parasitology)

Time: 3 Hours.

Full Marks: 80

*Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.*

GROUP-A

1. How parasites are transmitted by mosquito and housefly?
2. Explain in detail the life cycle of *Leishmania donovani*.
3. Give an account of life cycle of *Ancylostoma*.
4. What causes kala-azar? Describe symptoms, diagnosis, treatment and its preventive measures.
5. Write short notes on any **Two** of the following :
 - (a) Encystment
 - (b) B-Lymphocytes
 - (c) Elephantiasis
 - (d) Fleas

GROUP-B

6. What are antigens? How do they effect our immune system?
7. Describe prevention and control of livestock diseases.
8. Describe the secondary lymphoid organs and their functions in the immune responses.
9. Enumerate the technique of counter Immunelectrophoresis.
10. Write short notes on any **Two** of the following :
 - (a) ELISA
 - (b) Neutrophils
 - (c) Liver fluke
 - (d) Mast cells.

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NALANDA OPEN UNIVERSITY

Annual Examination, 2013

M.Sc. Zoology

PART-II, PAPER-XIII

(Developmental Biology)

Time: 3 Hours.

Full Marks: 80

*Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.*

GROUP-A

1. Describe the process of spermatogenesis.
2. Describe molecular events in fertilization in vertebrate.
3. Give an account of different patterns of cleavage.
4. Give an account of development of extraembryonic membrane in amniotes and their functions.
5. Write short notes on any **Two** of the following :
 - (a) Ovulation
 - (b) Polymbryonic fertilization
 - (c) Macrolecithal egg
 - (d) Acrosome

GROUP-B

6. Give an account of role of juvenile hormone in insect metamorphosis.
7. Describe characteristic features and applications of stem cells.
8. Describe the role of thyroxine in amphibian metamorphosis.
9. Describe the various types of differentiation during animal development.
10. Write short notes on any **Two** of the following :
 - (a) Ecdysone
 - (b) Totipotency of cell
 - (c) Bone marrow
 - (d) Adult stem cell

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NALANDA OPEN UNIVERSITY

Annual Examination, 2013

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

Time: 3 Hours.

Full Marks: 80

*Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.*

GROUP-A

1. Describe the structure of pituitary gland and mention the functions of hormones secreted by it.
2. Give an account of histology of thyroid gland and biosynthesis of thyroxine.
3. Give an account of histology of adrenal gland and mention the functions of hormones secreted by medulla region of adrenal gland.
4. Describe the physiological actions of insulin and glucagon.
5. Write short notes on any **Two** of the following:
 - (a) Hypothyroidism
 - (b) M.S.H.
 - (c) Acromegaly
 - (d) Gigantism

GROUP-B

6. Describe the histology of ovary and functions of ovarian hormones.
7. Describe the biosynthesis and functions of different gastro-intestinal hormones.
8. "Hormone as messenger" Discuss.
9. Describe the different diseases produced due to imbalance of different hormones.
10. Write short notes on any **Two** of the following:
 - (a) Emergency hormone
 - (b) Conn's disease
 - (c) Gastrin
 - (d) Implantation

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NALANDA OPEN UNIVERSITY

Annual Examination, 2013

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

Time: 3 Hours.

Full Marks: 80

***Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.***

GROUP-A

1. Describe the different types of mouthparts of insects.
2. Define taxonomy? How do you classify the insects.
3. Describe the mechanism of digestion in insects.
4. Give an account of Pheromones.
5. Write short notes on any **Two** of the following:
 - (a) Insect-host plant interaction
 - (b) Metamorphosis
 - (c) Malpighian tubules
 - (d) Spiracles

GROUP-B

6. Write an essay on biological control of insect pests.
7. Discuss the life history and control of any two pests of vegetables.
8. Write an essay on strategies of pest management.
9. Describe the types and uses of insecticides.
10. Write short notes on any **Two** of the following:
 - (a) Migrant pests
 - (b) Chemosterilization
 - (c) Economic injury level
 - (d) Host plants

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NALANDA OPEN UNIVERSITY
Annual Examination, 2013
M.Sc. Zoology
PART-II, PAPER-XVI
(Ichthyology & Inland fisheries)

Time: 3 Hours.

Full Marks: 80

*Answer five questions selecting at least two questions from each Group.
All Questions carry equal marks.*

GROUP-A

1. Give an account of classification of fishes up to orders with at least one example of each order.
2. Describe the digestive system of a herbivore fish, G-lamta.
3. Give an account of the air-breathing organs of a catfish, *Heteropneustes fossilis*.
4. Give an account of ecological status of rivers and streams.
5. Write short notes on any **Two** of the following:
 - (a) Gill ventilation
 - (b) Oceanography
 - (c) Opercular suction pumps
 - (d) Ganga river system

GROUP-B

6. What are the objective of fish culture? Describe fish culture in fresh water.
7. Describe the different crafts and gears used in fish capture in marine water system.
8. Describe cancer of fishes.
9. Write an essay on prawn culture in freshwater in India.
10. Write short notes on any **Two** of the following:
 - (a) Monoculture
 - (b) Fish flour
 - (c) Exotic carps
 - (d) Long drag net.

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