Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - I) (New) (NEP CBCS) Examination:
March/April - 2025
Biosystematic (2309101)

Day & Date: Thursday, 15-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Arrange the following taxonomic categories in their hierarchical order from highest to lowest
Genus, Family, Class, Order, Phylum _____.
a) Phylum, Order, Class, Genus, Family
b) Class, Phylum, Order, Family, Genus
c) Order, Phylum, Class, Family, Genus
d) Phylum, Class, Order, Family, Genus

2) All of the following are sources of genetic variation for evolution, except: _____.
a) mutation b) recombination
c) genetic drift d) gene flow

3) This is the key to speciation of populations _____.
a) reproductive health b) reproductive isolation
c) population growth d) extinction

4) This type of speciation enables production of hybrids between two species _____.
a) allopatric speciation b) parapatric speciation
c) bottleneck d) sympatric

5) Generally, within a lineage, the largest number of shared derived characters should be found among two organisms that are members of the same _____.
a) kingdom b) class
c) domain d) family

6) When using a cladistic approach to systematics, which of the following is considered most important for classification?
a) shared primitive characters
b) analogous primitive characters
c) shared derived characters
d) the number of homoplasies

7) Binomial nomenclature means writing the name of plant in two words which designate _____.
   a) Order and family b) Family and genus
   c) Species and variety d) Genus and species

8) The replacement of two kingdom classification by five kingdom classification was proposed by the year _____.
   a) 1853 b) 1859
   c) 1969 d) 1863

B) Fill in the blanks OR Write True/False **04**

1) The Swedish botanist _____ is called as the father of taxonomy.
2) Ichthyology is the study of _____.
3) Parcimony means _____.
4) Ornithology means study of _____.

Q.2 Answer the following. (Any Six) **12**

a) Importance and applications of biosystematics in biology?
b) What are the types of phylogenetic tree?
c) Define Geographic isolation.
d) What is meant by ICZN?
e) Define Typification.
f) What is the hierarchy of classification?
g) What is chemotaxonomy?
h) Define Reproductive isolation

Q.3 Answer the following. (Any Three) **12**

a) Binomial Nomenclature.
b) Describe ICZN with suitable example.
c) How to Construct Phylogenetic Trees?
d) Molecular taxonomy.

Q.4 Answer the following. (Any Two) **12**

a) Describe how taxonomic collection, preservation and curetting process done for identification.
b) Describe origin of reproductive isolation.
c) Historical resume of Systematic.

Q.5 Answer the following. (Any Two) **12**

a) Process of Typification for different Zoological Types.
b) Describe Parsimony method.
c) DNA-DNA Hybridization.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - I) (New) (NEP CBCS) Examination: March/April - 2025
Cell and Molecular Biology (2309102)

Day & Date: Saturday, 17-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) In simple diffusion, molecules cross the plasma membrane _____
   a) against the concentration gradient
   b) along the concentration gradient
   c) do not depend on concentration
   d) with the help of energy

2) _____ forms the cytoplasmic connections between plant cells
   a) Gap junction b) Tight junction
   c) Desmosomes d) Plasmodesma

3) Lysosomes are present in all cell, except _____
   a) muscle cells b) acinal cells
   c) erythrocytes d) hepatocytes

4) Cisternae are present in _____
   a) Cytoplasm b) Golgi bodies
   c) Lysosome d) nucleus

5) The kinesin is the motor molecules that are related to the _____
   a) Actin b) Intermediate filaments
   c) Microtubules d) Desmin

6) _____ acts as inhibitor of microfilament.
   a) Aspirin b) Cinchonine
   c) Colchicine d) Cytochalasin-B

7) _____ vesicle transport the secretory products from the *trans*Golgi network to late endosome.
   a) Clathrin coated b) COP II
   c) Primary d) COP I

8) Proteins that are synthesized by free polysomes are transported to _____
   a) lysosomes b) outside cell
   c) nucleus d) ER membrane

B) Fill in the blank. **04**

1) _____ is a membrane bound sac present in cell containing lytic enzymes
2) _____ are connections between two neurons or between a neuron and a non-neuronal cell
3) N-terminal sequence Lys-Asp-Glu-Leu (KDEL) destinates the proteins to _____
4) The cancer causing viruses are called as _____

Q.2 Answer the following. (Any Six) **12**

a) What is cancer?
b) Give protein sorting signals
c) Write a note on actin binding proteins
d) What is transport across epithelia?
e) Draw labelled -Structure of nucleus
f) Causes of cancer
g) Function of mitochondria
h) Lysosomes

Q.3 Answer the following. (Any Three) **12**

a) Explain how tumor suppressor gene causes cancer with suitable example.
b) Explain the stable cell junctions - adhesion belts, desmosomes, hemidesmosomes.
c) Give accont on co ponents of plasma membrane
d) Give a note morphology of cancer cell

Q.4 Answer the following. (Any Two) **12**

a) Give an account on post translational modification, sorting, assembly and transport of lysosomal proteins
b) What is cytoskeleton? Illustrate the role of cytoskeleton in cell movement
c) Write about cancer treatment

Q.5 Answer the following. (Any Two) **12**

a) Illustrate in detail structural organization of nucleus and give its function
b) Explain in detail the structure of actin filament. Add a note on trade milling of actin filament
c) With neat labelled diagram explain the ultrastructure on mitochondria. Add a note of its function

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Set **P**

M.Sc. (Zoology) (Sem - I) (New) (NEP CBCS) Examination: March/April - 2025
Techniques in Biology (2309107)

Day & Date: Monday, 19-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Technique used to separate biomolecules based on their size and affinity is called as _____.
   a) Electrophoresis b) Chromatography
   c) PCR d) Centrifugation

2) _____ measures the percentage of healthy cells in population.
   a) PCR b) Chromatography
   c) Cell Viability Assay d) FTIR

3) _____ rays used to generate images of tissue and structure inside the body.
   a) Gamma b) X
   c) Alpha d) Beta

4) In cryopreservation storage is done in _____
   a) Paraffin b) Nitrogen gas
   c) Liquid nitrogen d) Liquid hydrogen

5) In _____ microscopy electron beam scans through sample.
   a) Light b) TEM
   c) SEM d) Compound

6) _____ is process that occurs when cells take in foreign DNA and express the genes encoded on that DNA.
   a) Cell Characterization b) Cell Cloning
   c) Cell culture d) Cell Transformation

7) NMR stands for _____.
   a) Nuclear Magnetic Resonance
   b) Nucleus Magnetic Reactor
   c) Nuclear Magnetic Reactor
   d) Nuclear Magnetic Reversion

8) _____ techniques used to make millions to billions of copies of a specific DNA sample copies.
   a) Electrophoresis b) NMR
   c) PCR d) FTIR

B) Stater True or False. **04**

1) Capillary culture Unit is used in cell culture technique.
   a) True b) False
2) Autoradiography is a process that separate cells by passing cells through a narrow flowing liquid stream.
   a) True b) False
3) HPLC is a type of Column chromatography.
   a) True b) False
4) In polymerase chain reaction Taq Polymerase used.
   a) True b) False

Q.2 Answer the following. (Any Six) **12**

a) Spectroscopy
b) Cryotomy
c) Suspension Culture
d) Freeze Drying
e) Chromatography
f) Cell Characterization
g) Principle of NMR
h) Cell separation

Q.3 Answer the following. (Any Three) **12**

a) Write note on culture media preparation.
b) Define PCR and write its applications.
c) Describe Ultracentrifugation technique.
d) Explain Electrophoresis and write its types.

Q.4 Answer the following. (Any Two) **12**

a) Write applications of lasers in biology.
b) Explain Cell characterization & Cell transformation.
c) Explain Radiolabel techniques in biology.

Q.5 Answer the following. (Any Two) **12**

a) Explain design and functioning of tissue culture laboratory.
b) Write note on Paper Chromatography.
c) Write principle and methods of DNA sequencing.

Seat No.	

Set P

M.Sc. (Zoology) (Sem - I) (New) (NEP CBCS) Examination: March/April - 2025
Economic Entomology (2309108)

Day & Date: Monday,19-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) _____ is major host for lac insect.
   a) Ziziphus b) Sal
   c) Custard apple d) Hibiscus

2) Good quality of food in apiculture known as _____.
   a) Royal jelly b) Bee bread
   c) Wax d) Honey

3) _____ Honey bee is known as Indian honey bee.
   a) A. Dorsata b) A. Mellifera
   c) A. Indica d) A. Florea

4) _____ is largest silk producer country in India.
   a) Assam b) Maharashtra
   c) Karnataka d) UP

5) Silk is obtained from _____ of silkworm.
   a) Egg b) Larva
   c) Pupa d) Cocoon

6) Silk contain _____ protein.
   a) Sericin b) Pectin
   c) Keratin d) Casein

7) Honey bees are belongs to family _____.
   a) Floridae b) Ricinidae
   c) Apidae d) Flaviviridae

8) Lac insect belongs to Family _____.
   a) Lacciferidae b) Apidae
   c) Ricinidae d) Floridae

B) State True or False. **04**

1) Worker bees in honey comb are larger than queen and drones.
2) Mulberry silk is produced from Muga silkworm.
3) Laic insect belongs to family lacciferidae.
4) Longform of IPM is Integrated pest management.

Q.2 Answer the following. (Any Six) **12**

a) What is Apiculture?
b) What is Sericulture?
c) What are economic importance of apiculture?
d) What is Biological pest control?
e) What is Apiary?
f) What are the types of cell culture?
g) Write a note on Lac culture.

Q.3 Answer the following. (Any Three) **12**

a) Write note on Lac culture and explain techniques used for lac culture.
b) Write types and casts of Honey bees.
c) Explain Life cycle of Mulberry silkworm in detail.
d) Explain biological pest control.

Q.4 Answer the following. (Any Two) **12**

a) Describe process of obtaining silk from cocoon of silkworm.
b) Explain products of apiculture and give its economic importance.
c) Explain modern trends used in pest control.

Q.5 Answer the following. (Any Two) **12**

a) Describe IPM.
b) Write note on sericulture and explain rearing of silkworm in detail.
c) Explain Management and economics of Lac culture in business.

Seat No.	

Set | P |

M.Sc. (Zoology) (Sem - I) (New) (NEP CBCS) Examination: March/April - 2025
Research Methodology (2309103)

Day & Date: Saturday, 24-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) _____ is a measurable representation of an abstract construct in research.
a) Variable b) Figures
c) Statistic d) Parameter

2) _____ is a measure of strength of evidence the sample data provides against the null hypothesis..
a) P-Value b) B-Value
c) D-Value d) H-Value

3) The educated guess based on observation in a research design is known as _____.
a) Theory b) Publication
c) Hypothesis d) Validation

4) The measure of the frequency with which the average article in a journal has been cited in a particular year is referred as _____.
a) Impact Factor b) Citation Index
c) H-Index d) I-Index

5) A set of systematically interrelated constructs and propositions is called as _____.
a) Data b) Theory
c) Hypothesis d) Facts

6) To steal and pass off the idea or words of another as one's own is called as _____.
a) Literature survey b) Referencing
c) Bibiography d) Plagiarism

7) The process of observing and recording observations that are collected as a research effort is called as _____.
a) Idea Making b) Concept Building
c) Measurement d) Construct Building

8) _____ is used as a tool to measure journal impact factor through citation reports.

a) Plagiarism b) Scopus
c) Mendeley d) Zotero

B) Write true or false **04**

1) Scientific method is a systematic approach to the discovery of new information.
2) Net Protector is one of the most popular citation management tools available today.
3) iThenticate is a plagiarism detection tool.
4) The main purpose of research is to discover answers to questions.

Q.2 Answer the following. (Any Six) **12**

a) Research
b) Variable
c) Hypothesis
d) Bar Chart
e) Sample
f) Journal
g) Abstract
h) Research- question

Q.3 Answer the following. (Any Three) **12**

a) Motivation and utility of research.
b) Features of a good research design.
c) Problems in the measurement in research or types of errors.
d) Define and discuss frequency table with example.

Q.4 Answer the following. (Any Two) **12**

a) Give an account on reference management software Zotero and Mendeley.
b) Define and discuss hypothesis and qualities of good hypothesis; add a note on Null and alternate hypothesis.
c) Explain with suitable example deductive and inductive theory.

Q.5 Answer the following. (Any Two) **12**

a) Discuss the layout of a research paper with a hypothetical research paper.
b) Give with examples an account on methods to search literature or required information for research.
c) Explain the characteristics of good sample and add a note on determination of sample size.

Seat No.	

Set P

M.Sc. (Zoology) (Sem - II) (New) (NEP CBCS) Examination: March/April - 2025
Embryology (2309201)

Day & Date: Wednesday, 14-May-2025 Max. Marks :60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose most appropriate correct answer from given options. 08

1) The egg in *Drosophila* is _____.
a) Isolecithal b) Mesolecithal
c) Telolecithal d) Centrolecithal

2) The initial dorsal-ventral axis in amphibian embryos is determined by _____.
a) The point of sperm entry
b) Gravity
c) The point of contact with the uterus
d) Genetic differences in the cells

3) The formation of three germ layer is characters of _____.
a) Morula b) Gastrula
c) Blastula d) Neurula

4) The genotype of unfertilized egg is _____.
a) Haploid b) Diploid
c) Polypoid d) Tetraploid

5) Conditional specification gives rise to a pattern of development referred to as _____.
a) Regulative development b) Mosaic development
c) Autonomic development d) Both b and c

6) The pattern of cleavage in human is _____.
a) spiral b) radial
c) bilateral d) rotational

7) During development, a single cell, called the _____, induces the vulva to form in *C. elegans.*
a) suspensor cell b) uterine precursor cell
c) anchor cell d) none of these

8) The limb buds in developing embryo is specified by _____.

a) Hox genes b) Tbx genes
c) Retenpoic acid d) Both a and c

B) Fill in the blanks. **04**

1) A _____ is a protein whose concentration gradient affects the developmental fate of the surrounding region.
2) In Vertebrates limb stylopod region consist of _____ bone.
3) When sperm and eggs fused with each other outside body, they are referred as _____.
4) _____ nervous system controls involuntary function of body.

Q.2 Answer any six from the following. **12**

a) What is fertilization? Give the steps involved in fertilization.
b) What is the evolutionary advantage of hermaphroditism?
c) Explain the morula stage in humans.
d) Define the terms:
  i) induction
  ii) competence
e) Draw a neat labelled diagram of limb axis in vertebrates.
f) What is zone of polarizing activity?
g) What are segmentation genes? Give their types
h) Discuss the stages of development in *Drosophila.*

Q.3 Answer any three from the following. **12**

a) Explain the gastrulation in amphioxus.
b) Write a note on potency of cell.
c) Give the brief account of development in *Drosophila.*
d) What is apical ectodermal ridge? Give its role in limb development.

Q.4 Answer any two from the following. **12**

a) Explain the proximal-distal limb axis specification in birds.
b) Describe in brief vulva formation in *Caenorhabditis elegans.*
c) Describe the organization of female reproductive system of human.

Q.5 Answer any two from the following. **12**

a) Write in detail role of homeotic genes in development of *Drosophila.*
b) Explain in detail commitment and determination in development.
c) Explain how spermatozoa encounter ova in different organism.

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Seat No.	

Set P

M.Sc. (Zoology) (Sem - II) (New) (NEP CBCS) Examination: March/April - 2025
Animal Physiology (2309202)

Day & Date: Friday, 16-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternatives. **08**

1) The main cause of most stomach ulcers is ____
a) Excessive alcohol consumption
b) Infection with Helicobacter pylori
c) Stress
d) Spicy food

2) ____ enzyme is primarily responsible for breaking down carbohydrates in the mouth.
a) Pepsin b) Lipase
c) Amylase d) Trypsin

3) ____ is the hormone stimulating the gallbladder to release bile.
a) Insulin b) Glucagon
c) Secretin d) Cholecystokinin (CCK)

4) The tiny air sacs present in human lungs is called ____
a) Alveoli b) Bronchus
c) Bronchioles d) All of the above

5) Purkinje fiber arc ____
a) Muscle fibres present only in the ventricle wall
b) Nerve fibres distributed in ventricles
c) muscle fibres distributed throughout the heart walls
d) nerve fibres found throughout the heart

6) Which blood component is primarily responsible for blood clotting?
a) Red blood cells b) Platelets
c) White blood cells d) Plasma

7) Which of the following is a common cause of kidney failure?
a) Low blood pressure b) Diabetes
c) Low blood sugar d) Kidney stones

8) ____ muscle type is responsible for pumping blood.
a) Skeletal muscle b) Smooth muscle
c) Cardiac muscle d) None of the above

B) Fill in the blanks OR write true/false **04**

a) Which protein is responsible lor blocking the myosin-binding sites on actin in a resting muscle? _____
b) Tetanus is primarily caused by the bacterium
c) In the process of digestion, carbohydrate is converted to monosaccharides proteins to amino acid, fat to fatty acid and glycerol, and nucleic acids to ____.
d) The windpipe is also called the ____

Q.2 Answer the following. (Any Six) **12**

a) Define digestion.
b) What is the primary function of the nephron in the kidney?
c) What is Respiration?
d) What are waler soluble vitamins?
e) Explain about waler soluble and insoluble Vitamins
f) Give Composition of blood.
g) Which pump helps maintain the resting membrane potential?

Q.3 Answer the following. (Any three) **12**

a) Explain about ECG.
b) Describe Physiology of Asthma: signs, symptoms, causes and treatment.
c) Explain the role of lite tongue as an accessory organ.
d) Describe Structure of nephron.

Q.4 Answer the following. (Any two) **12**

a) Describe Treatment of kidney failure with dialysis.
b) Describe Transport of oxygen and carbon dioxide in blood.
c) Explain absorption of Carbohydrates Proteins.

Q.5 Answer the following (Any two). **12**

a) Explain physiology of digestion. Describe structure and function of Digestive glands.
b) Describe Structure of heart. Explain conduction of heart beat.
c) Describe signs, symptoms and causes of Alzheimer's disease, and Parkinsons disease.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - II) (New) (NEP CBCS) Examination: March/April - 2025
Fishery Science (2309207)

Day & Date: Tuesday, 20-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) The freshwater fish 'Carp' belong to family _____.
a) Cyprinidae b) Characidae
c) Salmonodae d) Cichlidae

2) Which of these is a characteristic feature of most freshwater fish?
a) Streamlined bodies for fast swimming in open water
b) High salt tolerance
c) Ability to regulate water and salt through osmoregulation
d) Bright, reef-adapted coloration

3) Fish scales are smooth and circular in shape, commonly found in fishlike salmon and carp?
a) Cycloid scales b) Ctenoid scale
c) Placoid scales d) Ganoid scales

4) _____ is a typical example of a planktonic fish during its larval stage?
a) Tuna b) Cod
c) Mackerel d) Silver fish

5) Zooplankton are primarily classified as _____.
a) Primary producers b) Herbivores
c) Consumers d) Decomposers

6) _____ hormones is commonly used for inducing breeding in fish?
a) Insulin b) Thyroxine
c) Gonadotropin d) Adrenaline

7) The most commonly used method for preserving fish is _____.
a) Freezing b) Drying
c) Fermenting d) Smoking

8) Bioluminescence in fish is the result of a chemical reaction that involves which of the following molecules?
a) Chlorophyll b) Haemoglobin
c) Luciferin d) Myoglobin

B) Write True or False. **04**

1) All marine fish can survive in freshwater.
2) All fish have the same type of scales.
3) Isinglass is a form of gelatine derived from the swim bladders of certain fish.
4) The light-producing organs in fishes are known as photophores.

Q.2 Answer the following. (Any six) **12**

a) Give examples of major carp species.
b) Give examples of fresh water and marine water fishes.
c) Function of fish scales.
d) Define Brackish water ecosystem.
e) Define Planktonic and Benthic fishes.
f) Define monoculture and polyculture.
g) What are amazing fishes.
h) Give any two applications of fish glue.

Q.3 Answer the following. (Any three) **12**

a) Describe role of plankton in fish culture.
b) Describe general characters of fresh water fishes.
c) Give an account on coloration of fishes.
d) Explain the Chinese hatchery.

Q.4 Answer the following. (Any two) **12**

a) Describe the types of fish scales.
b) Describe characteristics of fresh water ecosystem.
c) Give an account on venomous glands in fishes.

Q.5 Answer the following. (Any two) **12**

a) Give an account on identification of larval stages of major carps.
b) Describe general characters of phytoplankton and zooplankton.
c) Describe in detail the fish products.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - II) (New) (NEP CBCS) Examination: March/April - 2025
Applied Parasitology (2309208)

Day & Date: Tuesday, 20-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) _____ disease is caused by a nematode.
a) Amoebiasis b) Leprosy
c) Filariasis d) Poliomyelitis

2) Trypanosoma belongs to which of the following group?
a) Mastigophora b) Sarcodina
c) Sporozoa d) Ciliate

3) Parasite that is also a vector host is _____.
a) Ascaris b) Bug
c) Fasciola d) House fly

4) Filarial larva can be collected from man's _____.
a) Peripheral blood at midnight
b) smears of spleen
c) smears of intestinal contents
d) biopsy of liver

5) This does not accurately describe Lymphatic filariasis _____.
a) intermediate vector is the mollusc
b) mainly affects the lower limb
c) Chyluria is the most common manifestation
d) is caused by the parasitic worms Wuchereriabancrofti and Brugiamalayi

6) The disease caused by the Taeniasolium is called as _____.
a) Cysticercosis b) Taeniasis
c) Phyllobothrium d) Dysentery

7) One of the following belongs to cestodes _____.
a) Liver Fluke b) Guinea worm
c) Tapeworm d) Ascaris

8) A sexual reproduction of trematodes occurs in _____

a) snail b) Vertebrates
c) Molluscs d) Both a & c

B) Fill in the blanks OR write true/false **04**

1) Ascarislumbricoides is transmitted by ingestion of eggs.
2) The principal site of gametocyte formation is the human gastrointestinal tract.
3) Liver fluke belongs to cestodes.
4) In an individual infected with ascaris, the larvae can be found in the intestine.

Q.2 Answer the following. (Any Six) **12**

a) Definitive host
b) Host parasite interaction
c) Parasite Periodicity
d) Secondary host
e) Classification of Cestodes
f) Geographical distribution of Taeniasaginata
g) Vector
h) Mutualism

Q.3 Answer the following. (Any Three) **12**

a) Explain Pathogenicity of Trypanosoma.
b) Write an account onTypes of parasites.
c) Describe pathogenicity, laboratory diagnosis and prophylaxis of Dracunculus medinensis.
d) Discuss control measures of Plasmodium vivax.

Q.4 Answer the following. (Any Two) **12**

a) Give general account on parasitic protozoans.
b) Explain Classification of parasitic nematode.
c) Give a detail account on laboratory diagnosis and prophylaxis Trichuristrichura.

Q.5 Answer the following. (Any Two) **12**

a) Explain life cycle Enamoebahistolytica.
b) Describe Life cycle Taeniasaginata.
c) Give detail account on signs, symptoms and causes of Bird flu.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - III) (New) (NEP CBCS) Examination: March/April - 2025
Biochemistry (2309301)

Day & Date: Thursday, 15-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) The lactose Contain glucose and galactose which are joined by _____ linkage.
a) alpha -1-6 b) beta-1-6
c) alpha -1-4 d) beta -1-4

2) Among the following _____ is an example of storage lipid.
a) Cardiolipin b) Ceramide
c) Phosphatidyl choline d) Triacylglycerol

3) The _____ acts as coenzyme for amino acid metabolism.
a) TPP b) PLP
c) NAD+ d) Biocyatin

4) _____ method of immobilization is only physical bonding of enzyme to carrier surface.
a) Cross lining b) Adsorption
c) Encapsulation d) Covalent bonding

5) The most important epimer of glucose is _____.
a) Galactose b) Xylose
c) Arabinose d) Fructose

6) The amount of energy released from ATP hydrolysis is _____.
a) -7.3 Kcal/mo1 b) 30.5 Kcal/mo1
c) +7.3 Kcal/mo1 d) +30.5 Kcal/mo1

7) Oxidation of which substance in the body yield the most calories ____.
a) Glucose b) Glycogen
c) Protein d) Lipid

8) _____ are esters of long chain saturated or unsaturated fatty acids with long chain alcohols.
a) Phospholipids b) Biological waxes
c) Triacylglycerols d) Sphingolipids

B) Fill in the blanks. **04**

1) _____ is a linear homopolysaccharide composed of N-acetyl-D-glucosamine residues joined by beta -1-4 glycosidic bond.
2) _____ are liquid at room temperature because of their relatively high proportion of long chain saturated fatty acids.
3) When the modulator is other than the substrate, the enzyme is said to be _____.
4) _____ amino acids are degraded to pyruvate or TCA cycle intermediates, all of which are precursors to glucose via gluconeogenesis.

Q.2 Answer the following. (Any Six) **12**

a) Write a note on structure of B- DNA.
b) Write a note on hydrogen bonding.
c) Write a note on Ribozyme.
d) Write a note on cyclic AMP.
e) Write a note on enzyme activators.
f) Write a note on lock-and- key model of enzyme.
g) Write a note on biosynthesis of triglycerols.
h) Write a note on isozymes.

Q.3 Answer the following. (Any Three) **12**

a) Give an account on structure and role of proteins.
b) Give an account on regulation of enzyme activity by non genetic mechanism.
c) Give an account on inter conversion of hexoses and pentoses.
d) Write a note on metabolic regulation during hypoxia.

Q.4 Answer the following. (Any Two) **12**

a) Give an account on biosynthesis of purines and pyrimidines.
b) Describe in details TCA cycle and give its energetics.
c) Explain Michaelis-Menten Equation of Enzymes catalysis.

Q.5 Answer the following. (Any Two) **12**

a) Describe in details Glycolysis and give its energetics.
b) Give an account on Amino acid metabolism.
c) Explain the Beta oxidation of lipids.

Seat No.	

Set P

M.Sc. (Zoology) (Sem - III) (New) (NEP CBCS) Examination: March/April - 2025
Comparative Animal Physiology (2309302)

Day & Date: Saturday, 17-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) In _____ the lens becomes completely or partially opaque.
a) Myopia b) Cataract
c) Conjunctivitis d) Colour blind

2) Oxygen carrying blood pigment in certain annelids is _____.
a) Hemoglobin b) Hemocyanin
c) Chlorocruorin d) Haemoerythrin

3) Muscle get fatigue due to accumulation of _____.
a) phosphate molecule b) ATP
c) lactic acid d) carbon dioxide

4) Light band of muscle fibre have _____ protein.
a) Myosin b) Actin
c) myosin and actin d) Lysine

5) Labor pain is caused due to _____.
a) FSH b) Oxytocin
c) Thyroid d) LH

6) HCL secretions in stomach are stimulated by _____.
a) Gastrin b) Acetylcholine
c) Somatostatin d) Liver

7) Cardiac muscles are mainly _____.
a) Striated muscles b) non striated muscles
c) striated and voluntary d) striated and involuntary

8) Frogs is hibernate during _____.
a) Winter b) Spring
c) Summer d) Autumn

B) Fill in the blanks. **04**

1) Oxygen carrying blood pigment in certain Molluscan is _____.
2) Anaerobic respiration in animals produces _____.
3) _____ is the ability of the nervous system to retain what is learned and experienced.
4) _____ is the process of enzymatic conversion food into simpler form.

Q.2 Answer the following. (Any six) **12**

a) Give 2 names of Neurotransmitters.
b) Name two hormones of Ovary.
c) Give 2 functions of cerebrum.
d) Name two hormones which help in digestion.
e) Name two muscle proteins.
f) Give two types of mode of nutrition.
g) Name the 2 waves of sleep.
h) Name the two reproductive cycles.

Q.3 Answer the following. (Any three) **12**

a) Describe Circadian rhythm.
b) Communication in Bees.
c) Describe voluntary and involuntary muscles.
d) Desert adaptations in camel.

Q.4 Answer the following. (Any two) **12**

a) Describe role of neurohormones.
b) Describe Circulation of body fluids and its regulation.
c) Write a note on Bioluminiscence in animals.

Q.5 Answer the following. (Any two) **12**

a) Describe Physiology of light reception and visual perception.
b) Describe Thermoregulation in animals.
c) Describe Menstrual cycle.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - III) (New) (NEP CBCS) Examination: March/April - 2025
Biostatistics (2309306)

Day & Date: Monday, 19-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) _____ of the following is a measure of central tendency. **.**
a) Range b) Variance
c) Arithmetic mean d) Standard deviation

2) The median is best defined as _____.
a) The sum of all values divided by the number of values
b) The value that appears most frequently in the data
c) The middle value when data is arranged in ascending or descending order
d) The measure of how spread out the numbers in a data set are

3) _____ of the following is an absolute measure of dispersion.
a) Range
b) Arithmetic mean
c) Pearson's correlation coefficient
d) Scatter diagram

4) The coefficient of variation is expressed as _____.
a) A percentage b) A frequency
c) A unitless ratio d) A standard value

5) In correlation, when the values of two variables increase or decrease together, the correlation is said to be _____.
a) Negative b) Zero
c) Positive d) Neutral

6) Karl Pearson's coefficient of correlation measures _____.
a) The spread of the data
b) The strength and direction of a linear relationship between two variables
c) The difference between two data sets
d) The association between ranked data

7) The probability of an event occurring is defined as _____.
   a) The number of outcomes divided by the total number of possible outcomes
   b) The square root of the event's frequency
   c) The difference between observed and expected values
   d) The sum of all absolute deviations

8) A chi-square test is used to _____.
   a) Test for differences between means
   b) Measure the strength of a correlation
   c) Test the goodness of fit between observed and expected data
   d) Measure the spread of a distribution

B) Write true */* false. **04**

1) The mode is the value that occurs most frequently in a data set.
2) Range is a relative measure of central tendency.
3) A scatter diagram visually represents the relationship between two variables.
4) In a binomial distribution, there are only two possible outcomes for each trial.

Q.2 Answer the following. **16**

a) Define arithmetic mean and explain its significance in statistics.
b) What is median and what is the formula for median?
c) What is quartile deviation and how is it calculated?
d) Define standard deviation.
e) Explain the concept of correlation.
f) What is mean by dispersion?
g) State the classical definition of probability.
h) What is the chi-square test?

Q.3 Answer the following. **12**

a) Explain the difference between Karl Pearson's coefficient of correlation and rank correlation.
b) Discuss the properties of a normal distribution.
c) Describe the procedure of a chi-square test for goodness of fit. What are the key assumptions for using this test?

Q.4 Answer the following. **12**

a) Explain how to calculate the arithmetic mean, median, and mode for an individual series data set.
b) What are the different measures of dispersion? Describe each briefly.
c) Calculate the Karl Pearson's coefficient of correlation of given data.
X = 32, 55, 49, 60, 43, 37, 43, 49, 10, 20
Y = 40, 30, 70, 20, 30, 50, 72, 60, 45, 25

Q.5 Answer the following. **12**

a) Define binomial distribution and explain its properties with an example.

b) Describe the steps involved in conducting a paired and unpaired t-test.

c) What is normal distributions? Give the properties of normal distribution.

SLR-ZS-13

Seat No.	

Set P

M.Sc. (Zoology) (Sem - III) (New) (NEP CBCS) Examination: March/April - 2025
Bioinformatics (2309307)

Day & Date: Monday, 19-May-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

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Q.1 A) Choose correct alternative. (MCQ) **08**

1) What does drug designing aim to achieve in molecular modeling? **.**
a) Structural classification of animals
b) Identification of therapeutic targets
c) Study of ecosystems
d) Behavioral studies of organisms

2) Genomics is primarily concerned with studying _____.
a) Proteins and their functions
b) DNA sequences and genetic information
c) Chemical properties of compounds
d) Ecological interactions

3) Which of the following is NOT a technique used for separation of molecules?
a) Gel electrophoresis b) Centrifugation
c) DNA sequencing d) Chromatography

4) Bio Java is specifically designed for _____.
a) Connecting Java with chemical databases
b) Processing biological sequences and data
c) Statistical analysis in Java
d) Object-oriented modeling

5) Which part of protein structure involves the 3D arrangement of polypeptide chains?
a) Primary structure b) Secondary structure
c) Tertiary structure d) Quaternary structure

6) In bioinformatics, tertiary structure prediction is used to understand _____.
a) Gene sequences
b) Functional interactions of proteins
c) Water absorption in cells
d) Evolutionary changes in populations

7) Which of the following is a tool commonly used for nucleic acid sequencing?

a) Centrifugation b) Sanger sequencing
c) PCR analysis d) Gel electrophoresis

8) In bioinformatics, which tool is typically used for predicting the secondary structure of proteins?

a) BLAST b) Ramachandran Plot
c) Clustal W d) PSIPRED

B) Write true/false. **04**

1) Cheminformatics helps in managing and analyzing biological sequence data.
2) Proteomics is the study of proteins and their interactions within a cell.
3) Tertiary structure prediction provides insight into protein folding and functional sites.
4) Core Java is mainly used for ecological modeling in bioinformatics.

Q.2 Answer the following. (Any Six) **12**

a) What is the significance of tertiary structure prediction of proteins in drug discovery?
b) How does proteomics differ from cheminformatics in biological research?
c) Briefly explain how molecular modeling aids in understanding molecular interactions.
d) What are the common bioinformatics tools used to predict secondary structures of proteins?
e) Explain the concept of JDBC and its role in Java-based applications.
f) What are the key differences between primary and secondary structure of proteins?
g) What is chromatography technique?
h) Describe Salting out process.

Q.3 Answer the following. (Any Three) **12**

a) Describe the application of cheminformatics in organizing and analyzing chemical and molecular data for drug discovery.
b) Explain the techniques used for the detection and separation of known molecules in bioinformatics research.
c) Discuss the importance of sequencing nucleic acids and proteins in genomics and proteomics.
d) What are the core principles of Object-Oriented Programming (OOPs) in Java?

Q.4 Answer the following. (Any Two) **12**

a) Explain the methods of drug designing using bio informatics tools. How do proteomics and cheminformatics contribute to this process?

b) Discuss the various techniques used for nucleic acid sequencing and their significance in genomics research.

c) Describe the role of bioinformatics in studying human diseases, focusing on secondary and tertiary structure prediction of proteins.

Q.5 Answer the following. (Any Two) **12**

a) Explain the methods used for secondary structure prediction of proteins?

b) Describe the key Principles of Object-Oriented Programming (OOP)?

c) Describe the nucleic acid sequencing method?

Seat No.	

Set P

M.Sc. (Zoology) (Sem - III) (Old) (CBCS) Examination: March/April - 2025
Molecular Cytogenetics (MSC31301)

Day & Date: Thursday, 15-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **10**

1) _____ part of the chromosome connects sister chromatids?
a) Telomere b) Centromere
c) Chromatin d) Histone

2) Which type of chromatin is transcriptionally active?
a) Heterochromatin b) Euchromatin
c) Satellite DNA d) Centromeric DNA

3) In humans, dosage compensation is achieved through _____.
a) X-chromosome inactivation
b) Double activation of X-chromosome
c) Y-chromosome inactivation
d) Both X chromosomes being equally active

4) Gene imprinting refers to _____.
a) Genes expressed only on the Y chromosome
b) Differential expression of genes based on parental origin
c) Inactivated genes in somatic cells
d) None of the above

5) What is the main characteristic of viral genomes?
a) Linear DNA
b) Only RNA
c) Circular or linear DNA/RNA
d) Only DNA

6) Which is a key feature of the C-value paradox?
a) Genome size correlates directly with organism complexity
b) Genome size is unrelated to organism complexity
c) Prokaryotic genomes have higher C-values than eukaryotic genomes
d) C-value increases with gene number

7) _____ bacteriophage cycle integrates viral DNA into the host genome.
a) Lytic cycle b) Lysogenic cycle
c) Conjugation d) Transformation

8) _____ banding technique helps identify AT-rich regions in chromosomes.

a) R-banding b) Q-banding
c) G-banding d) FISH

9) Which chromosomal disorder is caused by a mutation in the beta-globin gene?

a) Down syndrome b) Sickle cell anemia
c) Turner syndrome d) Hemophilia

10) Which molecular technique is used to separate proteins based on size?

a) Southern blotting b) PCR
c) Western blotting d) Northern blotting

B) Write True / False. **06**

1) Euchromatin is always located at the centromere of chromosomes.
2) Imprinting results in the silencing of one allele depending on its parental origin
3) The C-value paradox refers to the proportional relationship between genome size and complexity.
4) The lysogenic cycle allows viral DNA to integrate into the host genome without causing immediate lysis.
5) Sickle cell anemia is an example of a chromosomal numerical alteration.
6) RFLP analysis is used in forensic science for DNA fingerprinting.

Q.2 Answer the following question. **16**

a) Describe the structure of metaphase chromosomes and explain the role of centromeres.
b) Explain the concept of the C-value paradox and its implications in genome size variation.
c) Explain FISH technique.
d) Describe chromosome painting.

Q.3 Answer the following question.

a) Describe the structure of chromatin and explain euchromatin and heterochromatin. **08**
b) Write the applications of chromosome painting. **08**

Q.4 Answer the following question.

a) Explain southern and northern blotting techniques. **08**
b) Explain dosage compensation of sex determination in C. elegans. **08**

Q.5 Answer the following question.

a) Describe Transposable elements. **08**
b) Describe the structure and life cycle of bacteriophage. **08**

Q.6 Answer the following question.

a) Write the applications of RFLP in forensic science. **08**

b) Write short note on human karyotype. **08**

Q.7 Answer the following question.

a) Write short note on PKU. **08**

b) Describe the methods of Sanger sequencing. **08**

Seat No.	

Set P

M.Sc. (Zoology) (Sem - III) (Old) (CBCS) Examination: March/April - 2025
Biochemistry (MSC31302)

Day & Date: Saturday, 17-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose the most correct alternative given below to the question. 10

1) _____ is a type of RNA, which is involved in gene silencing mechanism.
a) miRNA
b) rRNA
c) tRNA
d) mRNA

2) _____ is an example of sulpher containing amino acid.
a) Valina b) Cysteine
c) Serine d) Histidine

3) The _____ law of thermodynamics states that total energy of universe is constant.
a) zeroth b) First
c) Second d) Third

4) From stoichiometry of oxidative phosphorylation, one $FADH_2$ yields _____ATPs.
a) 1.5 b) 2.0
c) 2.5 d) 3.0

5) The transamination reaction is said to _____ reaction.
a) anergonic b) exergonic
c) endergonic d) exothermic

6) The enzymes of β-oxidation are found in _____.
a) mitochondrial matrix b) nucleus
c) cytoplasm d) Golgi apparatus

7) _____ acts as connecting bridge between glycolysis and TCA cycle
a) Propionyl CoA b) Acetyl CoA
c) Succinyl CoA d) HMG CoA

8) The *Km* value in enzyme kinetics is called as _____.
a) Kinetic measurement b) Velocity of reaction
c) Menten constant d) Michaelis constant

9) The enzymes with different structure, different properties but with same function are called as _____.
a) Allosteric enzymes b) Ribozymes
c) Abenzymes d) Isoenzymes

10) _____ amino acids are required for synthesis of pyrimidine.
a) Aspartate and alanine b) Glutamine and Arginine
c) Alanine and Arginine d) Aspartate and Glutamine

B) Fill in the blanks. **06**

1) The sugar present in milk is _____.
2) The two stands of double helical structure of DNA stands are held together by _____ bond.
3) The reaction in which removal of electrons takes place is called _____.
4) The reactions of glycolysis takes place _____ of cell.
5) The amino acid which on breakdown converts to ketone bodies are called _____.
6) Catalytic RNA are called as _____.

Q.2 Answer the following. **16**

a) Draw and explain structure of cholesterol. Add a note on its role.
b) What is energy rich bond? Discuss the types of energy rich bonds.
c) Discuss the regulation of glycolysis reaction in detail.
d) Explain decarboxylation reaction of amino acid. Add a note on its products.

Q.3 Answer the following.

a) Explain in details methods of enzyme immobilization. **08**
b) Discuss the reactions of glycolysis with its energetics. **08**

Q.4 Answer the following.

a) Discuss the electron flow through electron transport system in oxidative phosphorylation. **08**
b) With neat labelled diagram explain the structure of B-form DNA. Add a note on forms of DNA. **08**

Q.5 Answer the following.

a) Illustrate the de novo biosynthesis of purine nucleotides. **08**
b) Write a note different structural level of proteins. **08**

Q.6 Answer the following.

a) Discuss the pentose phosphate pathway in detail. Add a note of its significance. **08**

b) Write a note on synthesis and breakdown reactions of amino acid metabolism. **08**

Q.7 Answer the following.

a) What is metabolism? Explain with example the coordinated control of metabolism. **08**

b) Explain in detail IUB classification system and nomenclature criteria of enzymes. **08**

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - III) (Old) (CBCS) Examination: March/April - 2025
Comparative Animal Physiology (MSC31306)

Day & Date: Monday, 19-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **10**

1) Haemoglobin is the _____ pigment in mammals. **.**
a) Skin b) Respirator
c) Excretory d) Retinal

2) _____ is the mechanism by which an animal obtains and utilizes food materials.
a) Feeding b) Breathing
c) Mating d) Synthesizing

3) _____ is the mode of nutrition in higher animals.
a) Parasitic b) Saprozo
c) Holozoic d) Autotrophic

4) _____ is the pH of saliva.
a) 6.35-6.86 b) 7-8
c) 2.25-3.50 d) 1-2

5) Humans are_____ animals.
a) Ammonotelic b) Uricotelic
c) Ureotelic d) both a and b

6) Mechanism of regulation, typically between entities and its environment of solutes and the loss and gain of water is known as _____.
a) Homeostasis b) Hemostasi
c) Thermoregulation d) Osmoregulation

7) Internal ear is an _____ organ in chordates.
a) Stato-acoustic b) Osmoregulator
c) Equilibrium d) Sound producing

8) Surrogacy is an example of _____.
a) WWF b) IVF
c) NIRF d) IFO

9) _____ is a state of controlled, temporary loss of sensation or awareness.

a) Coma b) Diziness
c) Brain dead d) Anesthesia

10) The natural phenomenon in which an organism produces and emits light is _____.

a) Adaptation b) Echolocation
c) Photosynthesis d) Bioluminescence

B) Write True / False. **06**

1) Monogastric, avian, ruminant, and pseudo-ruminant are basic types of digestive system.
a) True b) False

2) Hibernation is also known as summer sleep.
a) True b) False

3) Troponin (Tn) is the sarcomeric Ca2+ regulator for striated (skeletal and cardiac) muscle contraction.
a) True b) False

4) Gamma-aminobutyric acid (GABA), glycine and serotonin are examples of inhibitory neurotransmitters.
a) True b) False

5) Neurohormone is secreted by Hypothalamus.
a) True b) False

6) During sleep respiratory system becomes inactive.
a) True b) false

Q.2 Answer the following. **16**

a) Explain food and diet specificity.
b) Explain Hibernation.
c) Cardiac cycle.
d) Give an account on surrogacy.

Q.3 Answer the following. **16**

a) Describe the physiology of light reception and visual perception.
b) Describe physiology of respiratory pigments in vertebrates.

Q.4 Answer the following. **16**

a) What is Osmoregulation? Describe process of osmoregulation in marine fishes.
b) Give an account of desert adaption of Osmoregulation.

Q.5 Answer the following. **16**

a) Describe stato-acoustic organ in vertebrates.
b) Explain Cardiac cycle? Explain role of LDH in cardiac physiology.

Q.6 Answer the following. **16**

a) Give an account on contractile elements.

b) Describe reproductive cycles in mammals.

Q.7 Answer the following. **16**

a) Give an account on patterns of nitrogenous excretion in vertebrates.

b) Describe types of Neurotransmitters and its role.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - III) (Old) (CBCS) Examination: March/April - 2025
Economic Entomology (MSC31307)

Day & Date: Monday, 19-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **10**

1) Host plant of bombax mori is _____.
a) Mulberry b) Kusum
c) Palas d) Ber

2) Leishmania parasite is discovered by _____.
a) William Harding b) William Leishman
c) Carl linneus d) Rutherford

3) Silk contains _____ Protein.
a) Sericin b) Pectin
c) Keratin d) Caesin

4) Resinous secretion is secreted by _____.
a) Laccifer lacca b) Earthworm
c) Silkworm Cocoon d) Ringworm

5) _____ Honeybee is known as Rock bee.
a) Apis indica b) Apis dorsata
c) Apis mellifera d) Apis florea

6) In India largest production of silk from _____ Species of silkworm.
a) Tasar b) Muga
c) Eri d) Bombyx mori

7) _____ is has been recognised world's best quality of silk.
a) Mulberry b) Tassar
c) Eri d) Muga

8) Royal jelly is a food _____.
a) Drone b) Worker
c) Queen Bee d) Male bee

9) _____ is a relationship between two living species in which one organism is benefited at expense of other.
a) Predation b) Parasitism
c) Commensalism d) Mutualism

10) T. Cruzi, T. Brusi causes _____ disease.
a) Leishmaniasis b) Trypanosomiasis
c) Malaria d) Dengue

B) Fill in the blanks OR write true/false. **06**

1) Dengue is caused by leishmania donovani.
a) True b) False

2) Honey bees are belongs to family Bombycidae.
a) True b) False

3) Promastigote form of Trypanosoma is infective stage of Trypanosomiasis.
a) True b) False

4) Mulberry silk is produced by Bombyx mori.
a) True b) False

5) Use of biological cultural and chemical practices to control insect pest in agriculture production is called IPM.
a) True b) False

6) Rice weevil belongs to family Riccinidae.
a) True b) false

Q.2 Answer the following. **16**

a) Write economic importance of lac.
b) Describe mode of transmission of filariasis.
c) Describe Dengue and write its control measures.
d) Describe types of hosts.

Q.3 Answer the following. **16**

a) Describe types of parasites.
b) Describe control and transmission of Kala Aazar.

Q.4 Answer the following. **16**

a) Describe cocoon processing for silk fabric.
b) Give account on veterinary pests.

Q.5 Answer the following. **16**

a) Describe life cycle of lac insect with its economic importance
b) Describe biological agents and its merits and demerits.

Q.6 Answer the following. **16**

a) Describe mode of transmission and control on Leishmaniasis.
b) Describe products of Apiculture with its economic importance.

Q.7 Answer the following. **16**

a) Explain mode of transmission of parasite.
b) Describe mode of transmission of filariasis.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - IV) (New) (NEP CBCS) Examination: March/April - 2025
Animal Biotechnology (2309401)

Day & Date: Wednesday, 14-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose most appropriate correct answer from given options. 08

1) The cell which is restricted to produce only one type of cell is called _____.
a) Totipotent b) Pluripotent
c) Multipotent d) Unipotent

2) The $Cot_{1/2}$ of DNA is defined as _____.
a) the time taken to reanneal
b) concentration of DNA in cell at any time
c) amount of cytosine in single DNA strand
d) initial concentration multiplied by time of half DNA to reanneal

3) Nucleic acid hybridization is used to identify _____.
a) RNAs
b) Complementary base sequence
c) DNAs
d) Proteins

4) The cell with only single set of all basic chromosome is called _____.
a) Diploid b) Haploid
c) Polyploid d) Aneuploid

5) Capping is RNA processing in which to 5'-end of RNA _____ is added.
a) 5-methyuracil b) 7-methylguanosine
c) 5-methylguanosine d) 7-methyladenine

6) Three consecutive nucleotides in tRNA which are complementary to triplets of nucleotide in mRNA are termed as _____.
a) codons b) anticodons
c) messengers d) transporter

7) _____ is a biotechnological technique that uses homologous recombination to make specific, precise changes to a gene's sequence.
a) Gene targeting b) Gene sequencing
c) Genetic mapping d) Gene focusing

8) A set of standards used to regulate own or community activity in relation to biological world is _____.

a) Biowar b) Biopotency
c) Bioethics d) Biopiracy

B) Fill in the blanks. **04**

1) The enzyme which joins cut ends of DNA is _____.
2) The termination factor associated with RNA polymerase is called as _____ factor.
3) The fragment of DNA which can change its locus is called _____.
4) _____ is a type of blood cell which looses its nucleus after maturation.

Q.2 Answer the following question (Any Six) **12**

a) What is protoplasm? How it is isolated?
b) Give a note on stem cell disorder.
c) Write a note on types of RNA polymerases in eukaryotes.
d) Give the significance of DNA methylation.
e) Why biosafety is important?
f) Enlist the steps where gene expression regulation is possible.
g) Define the terms
  i) exon and
  ii) intron
h) Explain the process of insulin production using genetic engineering.

Q.3 Answer the following question (Any Three) **12**

a) What is polymerase chain reaction? Explain its three steps.
b) Write a brief account on gene transfer method.
c) Explain the properties of genetic codes.
d) What are the ethical issues in human cloning.

Q.4 Answer the following question (Any Two) **12**

a) Explain in detail micropropagation and give its application.
b) What is southern blotting? Explain its method.
c) Explain the process of capping and slicing in hnRNA to produce mRNA.

Q.5 Answer the following question (Any Two) **12**

a) Discuss the process of translation in prokaryotes.
b) Describe the steps involved in genetic engineering.
c) Write a note on chemical method of nucleic acid sequencing.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - IV) (New) (CBCS) Examination: March/April - 2025
Zoo Keeping and Animal House Management (2309402)

Day & Date: Friday, 16-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) The _____ is the umbrella organization for the world zoo and aquarium community.
   a) WAZA b) CZA
   c) IUCN d) ZSI

2) Antharax is caused due to infection of _____.
   a) *Bacillus anthracis* b) *Mycobacterium bacillus*
   c) *Stephalococcus anthracis* d) *Bacillus bovid*

3) The process of protecting an endangered species of plant or animal outside its natural habitat is called as _____.
   a) In situ conservation b) ex situ conservation
   c) Cloning d) Farming

4) The first zoo to be formed in India was _____.
   a) Delhi Zoological Park b) Chennai Zoo
   c) Kolkata Zoo d) Bangalore zoo

5) CZA stands for?
   a) Central Zoo Administration of India
   b) Council of Zoo Administration of India
   c) Central Zoo Authority of India
   d) Central Zoo Administration of India

6) Which of the following is a Venomous snake species?
   a) Rat Snake b) Coral snake
   c) Python d) Boa

7) Preparing, stuffing, and mounting an animal for display or study is called as _____.
   a) Taxonomy b) ex situ conservation
   c) Taxidermy d) In situ conservation

8) Tuberculosis is caused by _____.
   a) *Mycobacterium tuberculosis* b) *Bacillus tuberculosis*
   c) *Clostridium perfringens* d) *Bacillus bovis*

B) Write True or False. **04**

1) Birds of Prey are Ratorial Birds.
2) HIV is a major disease in Chimpanzee's
3) ZSI controls the Zoo's in India
4) Kiwi are flightless birds

Q.2 Answer the following. (Any Six) **12**

a) Define: Anti-venom
b) Define: Taxidermy
c) Enlist deadly venomous snakes of India.
d) Enlist 4 wild cat species native to India.
e) What is significance of Zoo's for research?
f) What is significance of Public Awareness?
g) Enlist the feeding material used for Reptiles in Zoo's.
h) What are different types of Enclosures in Zoo's?

Q.3 Answer the following questions. (Any Three) **12**

a) Write a note on: Nocturnal Birds.
b) Write a note on: Animal House Management.
c) Write a note on: CZA.
d) Write a note on: Housing for Monkeys in zoo's.

Q.4 Answer the following questions. (Any Two) **12**

a) Explain Housing and Feeding of land Birds in Zoo's.
b) Write a detailed note on Common Diseases in Zoo Animals.
c) Enlist the Rules and Regulations for visitors in Zoo's.

Q.5 Answer the following questions. (Any Two) **12**

a) Write a detailed note on identification of Venomous and Non-Venomous snakes.
b) Explain Housing, Feeding and Breeding of Crocodiles in Zoo's.
c) Write a detailed note on: Elephant management in Zoo's.

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - IV) (New) (NEP CBCS) Examination: March/April - 2025
Conservation Biology (2309405)

Day & Date: Tuesday, 20-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Establishment of protected areas like sanctuaries and national park are examples of _____.
a) Conservation Biology b) Evolutionary Biology
c) Molecular Biology d) Cell Biology

2) The permanent disappearance of a species from earth is called _____.
a) Endangered b) Vulnerable
c) Extinct d) Migratory

3) Mutation, random mating, random fertilization are the causes of _____ diversity.
a) Genetic b) Ecosystem
c) Species d) Biodiversity

4) The value for Simpson's Diversity Index ranges between _____.
a) 1 and 2 b) 0 and 1
c) 2 and 3 d) 4 and 5

5) Direct use of natural resources like fuel, food and medicines by local community is _____ value of biodiversity.
a) Aesthetic b) Social
c) Consumptive d) Recreational

6) _____ a non-native organism that spreads rapidly and harms the environment, economy, or human health.
a) Endangered species b) Extinct species
c) Migratory species d) Invasive species

7) In PVA , V means _____.
a) Viability b) Viruses
c) Valuable d) Vulnerable

8) Chilka lake Ramsar site is located in ____.
a) India b) Pakistan
c) Srilanka d) Japan

B) Write true/false. **04**

1) Global biodiversity refers to the variety of life on Earth, encompassing all living organisms and their ecosystems.
2) Predation is a biological interaction where one organism, the parasite, benefits by living on or in another organism, the host, causing it harm.
3) Red Data Books are public documents that list and provide information about politics, history and economics of any country-
4) The headquarters of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is in Geneva, Switzerland.

Q.2 Answer the following. (Any six) **12**

a) Define Biodiversity.
b) Write formula of Shannon diversity index.
c) Define carrying capacity of ecosystem with any one example.
d) What is keystone species.
e) Give any two examples/causes of water and air pollution.
f) Give long form IUCN and location of its head quarter.
g) What is satellite tracking of animal.
h) Give few examples of biosphere reserves in India.

Q.3 Answer the following. (Any three) **12**

a) Describe preventive measures of extinction of species.
b) Give the importance of Biodiversity.
c) Write a note on Red Data Book.
d) Describe the role/ function of CBD and MAB.

Q.4 Answer the following. (Any two) **12**

a) Describe the concept and significance of Shannon and Simpson diversity indices in conservation biology.
b) Describe the values of Biodiversity.
c) Give an account on monitoring methods of conservation biology.

Q.5 Answer the following. (Any two) **12**

a) Describe the population regulation through prey-predator and predation-parasitism interaction.
b) Explain the threats of Biodiversity.
c) Give an account on national laws for protection to species.

Seat No.	

Set P

M.Sc. (Zoology) (Sem - IV) (New) (CBCS) Examination: March/April - 2025
Environmental biology and toxicology (2309406)

Day & Date: Tuesday, 20-May-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose the most correct alternative for given multiple choice question. **08**

1) What is the study of interactions between organisms and their environment called?
a) Toxicology b) Zoology
c) Ecology d) Microbiology

2) Which is an example of non-point source pollution?
a) Factory discharge b) Sewage pipe
c) Agricultural runoff d) Industrial chimney

3) What gas is responsible for the depletion of the ozone layer?
a) CO2 b) CH4
c) CFCs d) N2O

4) What does EIA stand for?
a) Environmental Impact Assessment
b) Ecological Intensity Analysis
c) Environment Industrial Audit
d) Energy and Impact Allocation

5) Which metal is most toxic and bioaccumulates in aquatic systems?
a) Zinc b) Mercury
c) Aluminum d) Iron

6) What is a natural method of waste decomposition?
a) Incineration b) Composting
c) Landfilling d) Chemical treatment

7) Which organ is mainly affected by air pollution?
a) Liver b) Heart
c) Lungs d) Kidneys

8) Which practice helps reduce soil erosion?
a) Deforestation b) Overgrazing
c) Contour plowing d) Mining

B) Fill in the blanks or write True/False. **04**

1) Bioaccumulation refers to the increase of substances in an organism over _____.
2) _____ pollution is caused by excessive heat discharged into water bodies.
3) Polyhouses mainly use _____ sheets to trap heat.
4) The most commonly regulated food safety body in India is _____.

Q.2 Answer the following. (Any six) **12**

a) Explain ecological pyramids.
b) Benefits of composting.
c) Ozone layer depletion.
d) Industrial waste management.
e) Components of ecosystems.
f) Effects of eutrophication.
g) Water pollution.
h) Methods to control air pollution.

Q.3 Answer the following. (Any three) **12**

a) What are food additives? Discuss their classification and effects.
b) Explain the structure and function of polyhouses.
c) Describe rainwater harvesting and its significance.
d) Write in brief about the carbon footprint and reduction strategies.

Q.4 Answer the following. (Any two) **12**

a) Explain the role of environmental legislation in India.
b) How do pesticides affect biodiversity?
c) Describe the Management of green house.

Q.5 Answer the following. (Any two) **12**

a) Explain solid west Management.
b) Explain food additives in the form of food colors and Preservatives.
c) Explain distribution and impact of environmental factors on the aquatic biodata.

Seat No.	

Set P

M.Sc. (Zoology) (Sem - IV) (Old) (CBCS) Examination: March/April - 2025
Animal Biotechnology (MSC31401)

Day & Date: Wednesday, 14-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose the most correct alternative given below to the question: 10

1) Genetically inactive areas of chromosomes are called _____.
a) Euchromatin b) Heterochromatin
c) Allochromosome d) Telomere

2) The inner part of long bones have _____ where blood cell formation will takes place.
a) Haversian canal b) Bone marrow
c) Blood vessels d) Hard tissue matrix

3) _____ is a biological phenomenon by which an organism produces one or more biochemicals that influence the germination, growth, survival, and reproduction of other organisms.
a) Allelopathy b) Induction
c) Regression d) Commitment

4) Because most of the amino acids are represented by more than one codons, the genetic code is said to be _____.
a) Deaminated b) Comma less
c) Degenerate d) Overlapping

5) In capping of mRNA, 5'-end is chemically modified by the addition of a _____.
a) methyl-guanosine b) methyl-adenosine
c) methyl-cytidine d) methyl-thymidine

6) The $Cot_{1/2}$ of DNA is defined as _____.
a) the time taken to reanneal
b) concentration of DNA in cell at any time
c) amount of cytosine in single DNA strand
d) initial concentration multiplied by time of half DNA to reanneal

7) _____ are enzymes responsible to join cut end of DNA.
a) Endonucleases b) Exonucleases
c) DNA ligases d) Helicases

8) The first clinical gene therapy was done for the treatment of _____.
a) AIDS
b) Cancer
c) Cystic fibrosis
d) SCID due to deficiency of adenosine deaminase

9) _____ is referred are equational cell division.
a) Amitosis b) Mitosis
c) Meiosis d) Binary fission

10) In eukaryotic cell transcription and RNA capping take place inside the _____.
a) Peroxisomes b) Nucleus
c) endoplasmic reticulum d) Ribosomes

B) Fill in the blanks. **06**

1) In eukaryotes genes protein-coding part is called exon and non-coding part is called _____.
2) The method in which foreign DNA is introduced into cell by virus or viral vector is called _____.
3) _____ is hybrid cell generated by implantation of a cell nucleus into denucleated cells during tissue culture.
4) _____ subunits of RNA polymerase is required to initiate transcription.
5) The chromosomes are arranged at equator during mitosis in _____ phase.
6) The cluster of genes which are under common regulatory process is called as _____.

Q.2 Answer the following. **16**

a) Write a note on methods for measuring nucleic acid and protein interactions.
b) Explain in brief about regulatory sequences involved in gene regulation.
c) What is stem cell therapy? Explain it.
d) Explain in brief biosafety regulation.

Q.3 Answer the following.

a) Discuss in detail somatic hybridization. **08**
b) Discuss in detail the process of protein synthesis in prokaryotes. **08**

Q.4 Answer the following.

a) Write a note on process of haematopoiesis **08**
b) What is genetic code? Explain its properties. **08**

Q.5 Answer the following.

a) Discuss in detail about the role of Cyclin/Cdc (MPF) in mitosis. **08**
b) Write an essay on gene targeting with special emphasis on its methods and applications. **08**

Q.6 Answer the following.

a) Explain the applications of biotechnology in health and industry. **08**

b) Describe the regulation of gene expression by environmental factors. **08**

Q.7 Answer the following.

a) Write an essay on transcription process in prokaryotes. **08**

b) Describe in detail the replicative and non-replicative mode of transposition. **08**

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - IV) (Old) (CBCS) Examination: March/April - 2025
Applied Zoology (MSC31402)

Day & Date: Friday, 16-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Multiple Choice Questions. **10**

1) A process where eggs are fertilized by sperm outside the body and then implanted in the uterus is called _____.
a) IVF b) WWF
c) ZSI d) IIMP

2) At what temperature are most biological samples typically stored during cryopreservation?
a) 0°C b) -20°
c) -80°C d) -196°C

3) The amniocentesis typically performed in the _____.
a) First trimester
b) Second trimester
c) Third trimester
d) It can be performed at any stage

4) The _____ process is often utilized by those who are unable to conceive or carry a pregnancy due to various medical, personal, or social reasons.
a) Abortion b) Surrogacy
c) Organ donation d) Totipotency

5) Following _____ is primarily found in the blood and is effective in forming complexes with antigens.
a) IgE b) IgD
c) IgM d) IgA

6) _____ are biological preparations designed to provide immunity against specific infectious diseases.
a) Hormones b) Enzymes
c) Medicines d) Vaccines

7) Lymphocytes are a type of white blood cell that plays a crucial role in the _____ system.
a) Immune b) Excretory
c) Digestive d) Reproductive

8) Incidents like the 2001 anthrax attacks in the United States is an example of _____.

a) Bioterrorism b) Ecotourism
c) Bioluminescence d) Biodiversity

9) The branch of medicine that focuses on the study of blood, blood-forming tissues, and the disorders associated with them is called ____.

a) Immunology b) Hematology
c) Cytology d) Virology

10) The most commonly used species in vermitechnology is _____.

a) P.americana b) L.rohita
c) E.fitida d) L.lacca

B) Write True or False. **06**

1) In vitro fertilization (IVF) is a process where eggs are fertilized by sperm outside the body and then implanted in the uterus.
2) Cryopreservation of gametes refers to the process of freezing and storing reproductive cell.
3) Immunoglobulin"s are produced by B cells, a type of red blood cell.
4) Immunology is the branch of biomedical science that focuses on the study of the immune system.
5) Hepatitis is an inflammatory condition of the kidney, often caused by viral infections.
6) Vermitechnology, or vermiculture, is the science and practice of using earthworms for various agricultural, environmental, and waste management purposes.

Q.2 Answer the following question **16**

a) Describe the process of Amniocentesis.
b) Write a note on modern trends in contraception.
c) Describe history and scope of immunology.
d) Give an account on vaccines.

Q.3 Answer the following question

a) Give an account on collection and cryopreservation of gametes. **08**
b) Describe importance of vermiculture. **08**

Q.4 Answer the following question

a) Describe HLA system in human. **08**
b) Write a note on biological warfare and its control. **08**

Q.5 Answer the following question

a) Give an account on surrogate pregnancy. **08**
b) Describe innate immunity and humoral immunity. **08**

Q.6 Answer the following question

a) Describe monoclonal and polyclonal antibody. **08**

b) Give an account on human parasites. **08**

Q.7 Answer the following question

a) Describe the IVF sterility and its treatment. **08**

b) Give an account on Blood cell Routine tests of blood for hepatitis and ELISA. **08**

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - IV) (Old) (CBCS) Examination: March/April - 2025
Environmental Biology and Toxicology (MSC31403)

Day & Date: Tuesday, 20-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose the most correct alternative for given multiple choice question. **10**

1) In which type of ecosystem is productivity highest? .
a) Marine b) Tropical rainforest
c) Desert d) Tundra

2) The term 'biological control' refers to _____.
a) Use of chemicals
b) Introduction of natural predators
c) Mechanical control methods
d) Artificial manipulation of genetics

3) The Kyoto Protocol deals with _____.
a) Water conservation b) Global warming
c) Nuclear energy d) Deforestation

4) Which of the following is a primary cause of soil pollution?
a) Noise pollution b) Pesticides
c) Water scarcity d) Solar radiation

5) Limnology is the study of _____.
a) Oceans b) Rivers
c) Lakes d) Forests

6) Which term refers to the cyclic movement of nutrients in the ecosystem?
a) Energy cycle b) Population cycle
c) Biogeochemical cycle d) Biodiversity cycle

7) Which of the following is a known carcinogen?
a) Carbon monoxide b) Helium
c) Oxygen d) Benzene

8) Water recycling helps in _____.
a) Reducing water scarcity b) Controlling pollution
c) Both a and b d) Neither a nor b

9) The FDA is responsible for regulating _____.
a) Food and drugs b) Agricultural products
c) Forests d) Automobiles

10) What was the primary cause of the Chernobyl disaster?
a) Water contamination b) Deforestation
c) Oil spill d) Nuclear reactor explosion

B) Fill in the blanks. **06**

1) _____ is the process through which ecosystems regain their equilibrium.
2) Energy in ecosystems flows in _____ directions.
3) _____ is a toxic metal commonly found in industrial waste.
4) _____ is the primary gas responsible for the greenhouse effect.
5) The FDA regulates food _____.
6) Methyl isocyanate caused the _____ disaster in Bhopal.

Q.2 Answer the following. **16**

a) Explain the components of a food chain and how energy flows in an ecosystem.
b) What are the major types of pollutants? Provide examples.
c) Discuss the concept of eutrophication in freshwater ecosystems.
d) Write a short note on radiation pollution.

Q.3 Answer the following.

a) Describe the biogeochemical cycles in detail. **08**
b) Discuss how population ecology influences environmental conservation. **08**

Q.4 Answer the following.

a) Explain the causes and effects of air pollution. **08**
b) Discuss the various ways to reduce industrial waste in dairy and sugar industries. **08**

Q.5 Answer the following.

a) Explain the role of biodiversity in ecosystem sustainability. **08**
b) Discuss the impact of plastic waste on aquatic ecosystems. **08**

Q.6 Answer the following.

a) What are the potential effects of toxic pesticides on human health? **08**
b) Describe methods for managing household toxic waste. **08**

Q.7 Answer the following.

a) Discuss the significance of water recycling in modern conservation practices. **08**
b) Explain how food preservatives can affect human health, and the regulations governing them. **08**

Seat No.	

Set **P**

M.Sc. (Zoology) (Sem - IV) (New/Old) (CBCS) Examination: March/April - 2025: Zoo keeping and Animal House Management (MSC31406)

Day & Date: Thursday, 22-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

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Q.1 A) Choose correct alternative. (MCQ) **10**

1) The zoo located in Solapur is named as _____. **.**
a) Mahatma Gandhi Zoo b) Jawaharlal Nehru Zoo
c) Rajiv Gandhi Zoo d) Rani Laxmi Bai Zoo

2) Where is the headquarters of Central Zoo Authority, India?
a) Mumbai b) Chennai
c) Delhi d) Kolkata

3) Which one of the following is an example ex-situ conservation?
a) National Park b) Wildlife sanctuary
c) Seed bank d) Sacred groves

4) Headquartered of WWF is in _____.
a) The Hague, Netherlands b) Gland, Switzerland
c) Avenue du Mont-Blanc d) London, United Kingdom

5) Imprinting mechanism is found in _____.
a) Snakes and Reptiles b) Mammals and Fungi
c) Tortoises and Plants d) Ducks and Geese

6) The first zoo to be formed in India was _____.
a) Delhi Zoological Parkb b) Chennai Zoo
c) Kolkata Zoo d) Bangalore Zoo

7) Which one is not aquatic bird _____.
a) Panted Stork b) Purple Swamphen
c) Florican d) Osprey

8) _____ produces antivenom in India.
a) Haffkine b) Cipla
c) Lupin d) Dr. Reddy

9) Study of animal behaviour is called _____.

a) Ethology b) Trichology
c) Entomology d) Etiology

10) Which is viral zoonoses_____.

a) Anthrax b) Salmonellosis
c) Avian influenza d) Tuberculosis

B) Write true */* false. **06**

1) Slender coral snake is a non-venomous snake.
2) Rajiv Gandhi Zoological Park is located in Pune, Maharashtra.
3) Assam and Karnataka are the hot-wet forest where elephants live.
4) Sacred groves are the example of Ex-situ conservation.
5) Nightjar inactive nocturnally.
6) FAO officially launched the IYC 2024 on 4 Dec. 2023 in Rome.

Q.2 Answer the following. **16**

a) Short note: Zoo management policy of India
b) Short note: Nocturnal birds.
c) Explain the rules for visitors in zoo.
d) Write a short note on prevention of zoonotic disease.

Q.3 Answer the following.

a) Discuss about the venomous and non-venomous snakes of India. **08**
b) Explain the role of zoo in conservation, Education and awareness in India. **08**

Q.4 Answer the following.

a) Give an account on captive breeding and management of crocodiles in zoo. **08**
b) Explain housing and feeding of Rabbits in zoo. **08**

Q.5 Answer the following.

a) Give an account on public awareness programs inzoo. **08**
b) Write a note on Taxidermy and applications. **08**

Q.6 Answer the following.

a) Explain housing and feeding of Monkeys in zoo. **08**
b) Explain role and responsibility of Zoo animal keeper **08**

Q.7 Answer the following.

a) Give an account on management of grain eater and birds of prey. **08**
b) Explain in detail: Rodent management. **08**

Seat No.	

Set P

M.Sc. (Zoology) (Sem - IV) (New/Old) (CBCS) Examination: March/April - 2025
Fishery Science (MSC31407)

Day & Date: Thursday, 22-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **10**

1) Following _____ is an example of fresh water fish.
a) Labeo b) Angel fish
c) Tuna d) Bombay duck

2) Freshwater fish live in an environment where the water has a lower concentration of _____ than their body fluids.
a) Salts b) Oxygen
c) Minerals d) Haemoglobin

3) The earliest larval stage of major carps is _____.
a) Fry b) Spawn
c) Fingerling d) Advanced fry

4) Following _____ fish belongs to family cyprinidae.
a) Rohu b) Catla
c) Mrigal d) Silver carp

5) Following _____ ecosystem have high concentration of salts.
a) Marine water b) Fresh water
c) Pond water d) Brackish water

6) The primary hormone used to induce breeding in fish is _____.
a) Oxytocin b) Luteinizing Hormone
c) Insuline d) Adrenaline

7) _____ of fish refers to the practice of raising a single species of fish in aquaculture or fish farming operations.
a) Polyculture b) Monoculture
c) Aquaculture d) Pisciculture

8) Following _____ is a method of fish preservation.
a) Catching b) Canning
c) Killing d) Frying

9) A product made by drying and grinding fish or fish waste into a fine powder, commonly used as animal feed or in fertilizers is called _____.

a) Fish meal b) Fish glue
c) Isinglass d) Fish fry

10) Diadromous and Catadromous terms are related with _____.

a) Fish feeding b) Fish migration
c) Fish catching d) Fish marketing

B) Write true */* false. **06**

1) Marine fishes are species that live primarily in marine environments.
2) Most freshwater fish species are viviparous.
3) Pectoral finis located near tail.
4) Zooplankton are small; microscopic animals.
5) Fish is an excellent source of high-quality protein, essential for building and repairing tissues in the body.
6) Torpedo fish have a electric organs.

Q.2 Answer the following. **16**

a) Describe the characters of fresh water fishes.
b) Give an account on identification of plankton.
c) Write a note on polyculture.
d) Explain anadromous migration in fishes.

Q.3 Answer the following.

a) Describe the conventional fishing methods. **08**
b) Describe culture techniques of major carps. **08**

Q.4 Answer the following.

a) Give an account on fish byproducts. **08**
b) Write a note on fish craft and gear. **08**

Q.5 Answer the following.

a) Describe the Chinese hatchery. **08**
b) Describe venomous glands in fishes. **08**

Q.6 Answer the following.

a) Describe faunal diversity of marine water ecosystem. **08**
b) Describe economic importance of fishes. **08**

Q.7 Answer the following.

a) Describe the fish preservation techniques. **08**
b) Describe the Bioluminescence in fishes. **08**

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - II) (NEP CBCS) Examination: March/April - 2025
Developmental Biology (MSC31201)

Day & Date: Sunday, 01-June-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q.Nos.1 and 2 are compulsory.
2) Attempt any three question from Q.No.3 to Q.No.7
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) Amplexus is a mating position found in _____.
a) Chick b) Amphioxus
c) Frog d) Man

2) The gut or digestive tract of a vertebrate arises from the _____.
a) Vegetal pole b) Primitive streak
c) Archenteron d) Somites

3) The capacitation is the _____.
a) Prerquirement for fertilization
b) Prerequirement for egg laying
c) Prerequirement for parental care
d) Prerequirement for feeding

4) At 24 hours of incubation, a chick embryo typically has _____ pairs of somites.
a) 8 pairs b) 4 pairs
c) 3 pairs d) 10 pairs

5) Development of gastrula starts from _____.
a) Fragmentation b) Clevage
c) Regeneration d) Blastula

6) Programmed cell death is called as _____.
a) Mitosis b) Meiosis
c) Lipolysis d) Apoptosis

7) Fertilization takes place in _____.
a) Ovary b) Fallopian Tube
c) Uterus d) Vagina

8) The process of formation of organs from three germ layers is called _____.

a) Organogenesis b) Oogenesis
c) Spermatogenesis d) Capacitation

9) In Holoblastic and Meroblastic are types of _____.

a) Cleavage b) Blastodisc
c) Egg d) Yolk

10) Fertilizin is a chemical substance produced from _____.

a) Mature eggs b) Acrosome
c) Polar bodies d) Middle piece of

B) Fill in the blanks. **06**

1) The vertebrate nervous system is derived from _____.
2) Three germ layers are formed during _____.
3) The mesoderm forms the blocks of _____.
4) A fertilized egg is called a _____.
5) The Central fluid filled cavity of the blastula is known as _____.
6) The fruit fly _____ has been extensively studied for over a century as a model organism for genetic investigations.

Q.2 Answer the following. **16**

a) Write a note on three germ layer formation in Amphioxus.
b) Describe the process of fertilization in amphibians.
c) Give an account on different types of eggs.
d) Prevention of polyspermy

Q.3 Answer the following.

a) Regulation of limb development in chordates. **08**
b) Describe process of organogenesis. **08**

Q.4 Answer the following.

a) Write a note on capacitation of sperm. **08**
b) Write in detail the process of Apoptosis. **08**

Q.5 Answer the following.

a) Describe neural tube formation in mammals. **08**
b) Describe the gastrula of chick. **08**

Q.6 Answer the following.

a) Give an account of neural tube formation in chick. **08**
b) Describe process of cleavage in frog. **08**

Q.7 Answer the following

a) Give an account on evolution of sexual reproduction in vertebrates. **08**
b) Describe Regulation of development in Drosophila. **08**