SLR-HS-1

Seat No.	

Set P

M.Sc. (Zoology) (Semester - I) (New) (NEP CBCS) Examination: October/November - 2025
Bio systematic (2309101)

Day & Date: Wednesday, 29-10-2025 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 comparison of molecular sequences to infer evolutionary history is called _____.
   a) Chemotaxonomy b) Cytotaxonomy
   c) Molecular phylogenetics d) Classical taxonomy

2) Formalin commonly used for preservation is:_____.
   a) 5% formaldehyde solution b) 10% formaldehyde solution
   c) 90% ethanol d) 100% methanol

3) The international standard for plant collection and storage is known as:_____.
   a) Herbarium method b) Spirit preservation
   c) Dry pinning d) Freezing

4) The main tool used in specimen identification is: _____.
   a) Dichotomous key b) Microscope
   c) Net d) Formalin

5) Typification ensures: _____.
   a) Stability in naming of species
   b) Faster molecular sequencing
   c) Elimination of synonyms completely
   d) Only field collection of organisms.

6) 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

7) Wet preservation is most suitable for: _____.
   a) Fishes and amphibians b) Dried leaves
   c) Fossils d) Insects only

8) Which of the following is the correct sequence in taxonomy?
   a) Preservation →Collection → Curation→Identification
   b) Collection →Preservation→Curation →Identification
   c) Identification →Preservation → Collection → Curation
   d) Collection → Identification → Preservation →Curation

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

1) The five-kingdom system of classification was proposed by____.
2) The first step in taxonomy is _____.
3) Pinning is a common method of preserving _____.
4) Phylogenetic classification is one which is based on _____.

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

a) Give two examples of binomial nomenclature.
b) Define parapetric speciation.
c) Why are molecular characters important in taxonomy?
d) What is meant by preservation in taxonomy?
e) Define Typification.
f) Define Panmictic speciation.
g) What is the hierarchy of classification?
h) Define neotype.

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

a) Describe applications of Biosystematics.
b) Explain Merits and demerits of taxonomical keys.
c) Explain rules for Binomial Nomenclature with suitable example.
d) Describe Parsimony methods of Phylogenetic inference.

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

a) Describe the role of International Code/Commission of Zoological Nomenclature (ICZN).
b) Describe Allopatric speciation sympatric speciation.
c) Describe hierarchy of categories.

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

a) Explain the different kinds of systematic publications in taxonomy and their significance.
b) Describe process of typification of different zoological types.
c) Write an essay on dichotomous keys with an example from Insecta.

Seat No.		Set	P

M.Sc. (Zoology) (Semester - I) (New) (NEP CBCS) Examination: October/November - 2025
Cell and Molecular Biology (2309102)

Day & Date: Friday, 31-10-2025 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) The uptake of glucose along with sodium ion inside cell is _____.
   a) Uniport b) Symport
   c) Antiport d) Passive transport

2) In 1873, Camillo Golgi discovered Golgi apparatus by using _____ to visualize Golgi apparatus.
   a) Silver stain b) Jannus green B
   c) Haematoxylin d) Orange G

3) In the nucleus, the nucleolus is _____.
   a) dispersed throughout the nucleoplasm
   b) concentrated at nucleolar organizer
   c) Located in nuclear membrane
   d) Attached to centromere of all chromosomes

4) Actin filament is not present in _____.
   a) flagella of bacteria
   b) sarcomere of skeletal muscle
   c) Microvilli of intestinal brush border
   d) Below plasma membrane during cytokinesis

5) The kinesin are the motor molecules that are related to the _____.
   a) intermediate filaments b) Microfilaments
   c) microtubules d) myosin filaments

6) A signal sequence for protein translocation in Endoplasmic reticulum is located at the _____.
   a) 3’ end of m-RNA b) C-terminus of protein
   c) Cytosolic face of ER d) N-terminus of protein

7) The carrier of oligosaccharide for protein glycosylation, which is present in ER membrane is _____.
   a) Phospholipid b) Anchor proteins
   c) Carnitine d) Dolichol

8) _____ is a not a property of cancerous cell.
   a) Contact inhibition
   b) Metastasis
   c) Change in antigenic property
   d) InvasiOn

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

1) _____ is type of lipid generally present in high percentage within membrane.
2) _____ is called as the suicidal bag of cell.
3) The cytoskeleton which maintains cell polarity is _____.
4) The gene which has potential to cause cancer is called as _____.

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

a) Write a note on chemical carcinogens.
b) Write a note on sorting of proteins in Golgi apparatus.
c) Explain the protein component of membrane lipid.
d) What is microtubule organizing center.
e) Give Phospholipid structure.
f) Metastasis.
g) Post transcriptional modifications of mRNA.
h) Cell cycle.

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

a) Write an essay on passive and active transport system across cell membrane.
b) Explain the ultrastructure and function of mitochondria.
c) Explain the component of biological membranes.
d) Explain with suitable example how tumor suppressor genes causes cancer.

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

a) Describe the structure and dynamics of microfilament.
b) Give an account on insertion of protein in ER membrane with their topology.
c) Explain the structure and function on nucleus.

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

a) What is cancer? Explain in detail morphology and properties on cancerous cells.
b) Write a note on biogenesis of mitochondria.
c) What is cell junction? Explain tight junction, gap junction and plasmodesmata.

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - I) (New) (NEP CBCS) Examination: October/November - 2025
Techniques in Biology (2309107)

Day & Date: Monday, 03-11-2025 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. (MCQ) **08**

1) The resolving power of a microscope is determined by _____.
   a) The eye lens' focal length and aperture
   b) The eye lens' focal length and objective
   c) The objective and eye lens' apertures
   d) The wavelength of light lighting the object

2) Polymer Chain reaction is used for which of the following?
   a) Constructing the RAPD maps
   b) Detecting the transgene presence in an organism
   c) Amplifying the gene of interest
   d) All of the above

3) Paper Chromatography is a separatory technique that is used to separate.
   a) Simple mixtures b) Complex mixtures
   c) Viscous mixtures d) Metals

4) The size of a thin layer of adsorbent is about _____.
   a) 0.1 mm b) 0.2 mm
   c) 0.3 mm d) 0.4 mm

5) The region of electromagnetic spectrum for nuclear magnetic resonance is _____.
   a) Microwave b) UV-rays
   c) Infrared d) Radio frequency

6) Centrifugation based on which of the following law?
   a) Pascal's law b) Stokes law
   c) Stain law d) Patrick's law

7) _____ b gel is used to separate larger molecules like DNA fragments.
   a) Polyacrylamide gel (PAGE)
   b) Cellulose acetate gel
   c) Agarose gel
   d) Chromatography paper

8) _____ is used to detect and visualize the location of a radiolabeled DNA molecule.
   a) Fluorescence microscopy b) X-ray crystallography
   c) Electron microscopy d) Autoradiography

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

1) In a PCR reaction, the DNA generated is itself used as a template for replication.
2) Sodium chloride solution is used as a spraying reagent in paper chromatography.
3) Paper chromatography is a type of partition chromatography.
4) Spectroscopic methods require less time and less amount of sample than classical methods.

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

a) Define SEM.
b) What is Cryopreservation.
c) Define Chromatography.
d) Define Absorption.
e) Write application of lasers in biology.
f) Give principles of Spectroscopy.
g) Define TLC.
h) Define centrifugation.

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

a) Discuss in detail Electrophoresis and its uses.
b) Explain of Sub-cellular fraction.
c) Give detail account on TLC and its application
d) Describe mechanism Flow cytometry.

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

a) Describe PCR and its applications.
b) Give detail account on paper chromatography and its application.
c) Explain types of DNA Sequencing and give its application.

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

a) Explain in detail account on Radio-label techniques in biology
b) Describe methods in Cryopreservation and its applications.
c) Discuss Types of Microscopes and give its uses in biology.

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - I) (New) (NEP CBCS) Examination: October/November - 2025
Economic Entomology (2309108)

Day & Date: Monday, 03-11-2025 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. (MCQ) **08**

1) _____ is known as Father of Apiculture.
   a) Thomas Adison b) Johann Dzierzon
   c) Mendel d) Lweis

2) Honeybees shows _____ type of mouth parts.
   a) chewing and biting b) chewing only
   c) chewing and lapping d) grinding

3) _____ is the end product of the selling in sericulture
   a) Pupa b) Cocoon
   c) Larvae d) Silk

4) Lac insect shows _____ types of mouth parts.
   a) Sap sucking b) Cutting
   c) Grinding d) Biting

5) Queen of bee is fed with _____ by workers.
   a) Nectar b) Due
   c) Honey d) royal jelly

6) In biological control _____ are used as living weapons.
   a) parasites b) predators
   c) parasitoids d) all the A,B,C.

7) _____ attracts male insects for mating.
   a) Pheromones b) Pesticides
   c) Fungicides d) Bactericides

8) Bee hive is only made up of _____ materials.
   a) Steel b) Iron
   c) Aluminium d) Wooden

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

1) Bee venom contains toxin.
2) Queen is developed from unfertilized egg-parthenogenetically.
3) Royal jelly is the food of drones.
4) In biological control all pollutions are avoided.

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

a) Importance of lac insect.
b) Species of silkworms.
c) Autocidal control.
d) Propolis of bees.
e) Casts of bees.
f) Predators of Lac insects.
g) Queen of lac insect.
h) Silk thread formation by silkworm larva.

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

a) Describe economic importance of lac.
b) Describe diseases of honeybees.
c) Explain life cycle of Lac insect with figure.
d) Describe structure and function of silkworm larva.

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

a) Describe life cycle of silkworm bombax morii.
b) Describe structure of artificial beehive.
c) Describe cultural method of rearing of lac insect.

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

a) Describe in detail integrated pest management programme.
b) Describe infra structure of modern beehive with diagram.
c) Explain process of silk formation from cocoon.

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Set | P

M.Sc. (Zoology) (Semester - I) (New) (NEP CBCS) Examination: October/November - 2025
Research Methodology (2309103)

Day & Date: Thursday, 06-11-2025 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. (MCQ) **08**

1) Research _____ is a concrete statement describing what the research is trying to achieve.
   a) Motivation b) Objectives
   c) Conclusion d) Result

2) Following _____ is not a characteristic of the scientific method.
   a) Objectivity
   b) Replicability
   c) Subjective interpretation
   d) Empirical testing

3) _____ are used when the researcher believes there is no relationship between two variables.
   a) Null hypothesis b) Alternative hypothesis
   c) Statistical Hypothesis d) Associative hypothesis

4) Following _____ is an exploratory research design.
   a) Case study b) Cross-sectional survey
   c) Experimental study d) Longitudinal study

5) _____ sampling is a probability sampling method.
   a) Convenience b) Simple random
   c) Quota d) Purposive

6) The main advantage of systematic sampling is _____.
   a) It guarantees complete randomness
   b) It is simple, quick, and easy to use
   c) It eliminates all sampling errors
   d) It requires no population list

.

7) The most important requirement for constructing a pie chart is _____.
   a) Values should be expressed in percentages
   b) Values should be arranged in ascending order
   c) The data must be qualitative only
   d) The mean of the data must be calculated first

8) The correct sequence of sections in a standard research paper is _____.
   a) Introduction → Results → Methods → Discussion → Abstract → References
   b) Abstract → Introduction → Methods → Results → Discussion → References
   c) Title → Abstract → Discussion → Results → Methods → References
   d) Title → Methods → Abstract → Introduction → Results

B) Write true or false **04**

1) Generability is the extension of research findings and conclusions from a study conducted on a sample population to the population at large.
2) Google Scholar is a plagiarism detection tool.
3) Random errors are the result of unpredictable changes.
4) Dependent variables are variables which are manipulated or controlled or changed.

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

a) Define research in simple terms.
b) What is the motivation behind doing research?
c) State two characteristics of scientific research.
d) What is qualitative research?
e) What is the importance of research design?
f) Write any two uses of tools in research.
g) Define bivariate analysis.
h) Give an example of software for detection of plagiarism.

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

a) Write a note on objectives of any research.
b) What are the features of good research design?
c) Explain the levels of measurement in research.
d) Write a note on Impact factor of journal.

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

a) Mention differences between descriptive and experimental research design.
b) Write the process and importance of publication.
c) Give an account on types of bivariate analysis.

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

a) Describe the characteristics of scientific methods in research.

b) Give an account on types of sampling methods in research.

c) Explain the ethical issues related to publication of research.

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Set P

M.Sc. (Zoology) (Semester - II) (New) (NEP CBCS) Examination: October/November - 2025
Embryology (2309201)

Day & Date: Tuesday, 28-10-2025 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 head of the sperms performs the functions of ____.
   a) Motility b) Energy
   c) Genetic and Activating d) Are generally dormant

2) Seminiferous tubules are separated by _____.
   a) Interstitial cells
   b) Sertoli cells
   c) Lining of the seminiferous tubules
   d) Intercellular fluid

3) The eggs of amphibian are _____.
   a) Alecithal b) Oligolecithal
   c) Polylecithal d) Mesolecithal

4) In frogs, the union of eggs and sperms takes place by _____.
   a) Copulation b) Pseudocopulation
   c) Coitus d) Parthenogenesis

5) Capacitation of sperm relates to _____.
   a) Fertilization b) Specificity of fertilization
   c) Spermiogenesis d) Spermatogenesis

6) Morphogenetic movement of blastomeres are represented by _____.
   a) Epiboly b) Emboly
   c) Gastrulation d) Both Emboly and Epiboly

7) The eggs of birds are _____.
   a) Microlecithal b) Alecithal
   c) Mesolecithal d) Macrolecithal

8) Secondary egg membrane is found in _____.
   a) Frog egg b) Reptiles
   c) Urodeles d) Birds

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

1) *C. elegans* are used as model organism because they are hermaphrodites.
2) Queen of Genetic is *Drosophila.*
3) In Development mechanism, the first stage is labile phase called induction.
4) During limb development Shh, Wnt and FGF pathway paly role.

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

a) Write a note on: Blastula of chick
b) Write a note on: Gastrula of *Amphioxus*
c) Write a note on: Egg of Mammals
d) Write a note on: Blastula of frog
e) Write a note on: Sperm of *Amphioxus*
f) Write a note on: Structure of Insect Egg
g) Define: Potency
h) Define: Specification

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

a) Describe three germ layers in *Amphioxus.*
b) Explain in short organization of nervous system.
c) Explain in detail types of eggs.
d) Explain difference between blastula and gastrula.

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

a) Give an account of development of limb in Mammals.
b) Write note on cell apoptosis.
c) Describe with diagrammatical capacitation and mechanism of fertilization.

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

a) Explain the Evolution of sexual reproduction in eukaryotes.
b) Explain in detail regulation and development in *Drosophila.*
c) Explain detail structure of Chick Egg.

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Seat No.	

Set P

M.Sc. (Zoology) (Semester - II) (New) (NEP CBCS) Examination: October/November - 2025
Animal Physiology (2309202)

Day & Date: Thursday, 30-10-2025 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) Pancreas produce _____ that aids in digestion.
   a) Saliva b) Bile
   c) Digestive enzymes d) Insulin

2) _____ is the primary treatment for stomach ulcers.
   a) Antibiotics b) Surgery
   c) Change in diet d) Antacids

3) Gaseous exchange takes place in _____.
   a) Alveoli b) Pharynx
   c) Larynx d) Trachea

4) The tricuspid valve is present between _____.
   a) Ventricle and pulmonary artery
   b) Ventricle and aorta
   c) Left auricle and left ventricle
   d) Right auricle and right ventricle

5) Primary function of red blood cells (erythrocytes) is _____.
   a) Transporting oxygen to tissues
   b) Fighting infection
   c) Clotting blood
   d) Transporting nutrients

6) The primary function of dialysis is _____.
   a) To cure kidney disease
   b) To artificially remove waste and fluid from the blood
   c) To replace the kidneys
   d) To prevent kidney damage

7) _____ muscle type is characterized by spindle-shaped, uninucleate cells and non-striated.
   a) Skeletal muscle b) Cardiac muscle
   c) Smooth muscle d) Striated

8) _____ molecule is released by motor neurons at the neuromuscular junction to initiate muscle contraction.
   a) Acetylcholine b) Dopamine
   c) Norepinephrine d) Serotonin

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

1) Main symptom of tetanus is _____.
2) Characteristic symptom of Alzheimer's disease is _____.
3) The tiny air sacs present in human lungs is called _____.
4) Tetanus is primarily caused by the bacterium _____.

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

a) Give names of Digestive glands.
b) Give names of water soluble and insoluble Vitamins.
c) What are the different compositions of blood?
d) Explain mechanism of blood clotting.
e) List out the main of the digestive system.
f) Explain the main parts of the nephron.
g) What is the primary cause of cardiac arrest?
h) What is Respiration?

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

a) What is the treatment for kidney failure?
b) Describe Cardiac cycle.
c) Describe structure of neuron.
d) Explain signs, symptoms and causes of Parkinsons Syndrome.

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

a) Describe Ultra-structure of smooth, skeletal and cardiac muscle.
b) Describe mechanism of urine formation and its regulation.
c) Describe Transport of oxygen and carbon dioxide in blood.

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

a) How does digestion take place in the human body?
b) Describe Physiology of Asthma? Explain signs, symptoms, causes and treatment.
c) Explain physiology of digestion. Describe structure and function of Digestive glands.

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Seat No.	

Set P

M.Sc. (Zoology) (Semester - II) (New) (NEP CBCS) Examination: October/November - 2025
Fishery Science (2309207)

Day & Date: Saturday, 01-11-2025 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' belongs to family _____.
   a) Cyprinidae b) Characidae
   c) Salmonodae d) Cichlidae

2) The most characteristic feature of marine water fish is their _____.
   a) Streamlined bodies for fast swimming in open water
   b) High salt tolerance
   c) Osmoregulatory adaptations
   d) Locomotion

3) _____ scales are a type of bony fish scale characterized by their comb-like, or serrated, edges.
   a) Cycloid scales b) Ctenoid scale
   c) Placoid scales d) Ganoid scales

4) _____ is a typical example of a nektonic fish.
   a) Tuna b) Labeo
   c) Whale d) Guppy fish

5) Following _____ is an example Zooplankton.
   a) BGA b) Dianoflagellates
   c) Daphnia d) Diatoms

6) Induced breeding is also known as _____ breeding.
   a) Natural b) Artificial
   c) Selected d) Clonal

7) The ____ of fish refers to the various methods and techniques used to maintain the quality and safety of fish for consumption over an extended period.
   a) Breeding b) Marketing
   c) Killing d) Preservation

8) Bioluminescence is the natural phenomenon in which living organisms produce and emit _____.
   a) Sound b) Colour
   c) Poison d) Light

B) Write True or False **04**

1) All marine fish can survive in marine water.
2) All fishes have different types of scales
3) Isinglass is a fish product which is derived from the scale of certain fish.
4) The light-producing organs in fish are known as chromophores.

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

a) Give examples of major carp species.
b) Give examples of marine water fishes.
c) Draw a figure of cycloid scale.
d) Define freshwater ecosystem.
e) Define Planktonic and Benthic fishes.
f) Define monoculture and polyculture.
g) Function of electric organ in fish.
h) Give any two applications of isinglass.

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

a) Describe role of plankton in fish culture.
b) Describe general characteristics of marine water fishes.
c) Give an account on coloration of fishes.
d) Explain the hatchinghappa.

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

a) Describe difference between cycloid and placoid scales.
b) Describe characteristics of freshwater ecosystem.
c) Give an account on electric organs in fishes.

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

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

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - II) (New) (NEP CBCS) Examination: October/November - 2025
Applied Parasitology (2309208)

Day & Date: Saturday, 01-11-2025 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 sexual cycle for the plasmodium is _____.
   a) Sporogony b) Gametogony
   c) Sporangium d) Spongiform

2) The intermediate host for the *Taeniasolium* is _____.
   a) Cattles b) Pigs
   c) Sheep d) Fish

3) *Dracunculus* is the causative agent for the _____.
   a) Pinworm b) Hookworm
   c) Guinea worm d) Anisakiasis

4) The study of parasites is known as _____.
   a) Virology b) Parasitology
   c) Bacteriology d) Biology

5) A sexual reproduction of trematodes occurs in _____.
   a) Snail b) Vertebrates
   c) Molluscs d) Both a & c

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

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

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

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

1) Amoebiasis disease is caused by a nematode.
2) The disease caused by the *Taeniasolium* is Phyllobothrium.
3) Parasite that is also a vector host is bug.
4) Filarial larva can be collected from man's Peripheral blood at midnight.

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

a) Monogenea.
b) Endoparasites.
c) Host specificity.
d) Intermediate host.
e) Pathogenicity.
f) Zoonotic diseases.
g) Mode of transmission.
h) Toxoplasmosis.

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

a) Give an account on Morphology of *Fasciolopsisbuski.*
b) Write a note on Host-parasite relationship.
c) Give general account on parasitic protozoans.
d) Explain larval form of cestodes.

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

a) Explain Classification and general account on parasitic cestodes.
b) Discuss Controlling measures of insect parasites.
c) Describe laboratory diagnosis and prophylaxis of *Hymenolepis nana.*

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

a) Give detail account on causes and symptoms of Rabies.
b) Describe life cycle *Giardia Iamblia.*
c) Discuss life cycle *Hymenolepis nana.*

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Set **P**

M.Sc. (Zoology) (Semester - III) (New) (NEP CBCS) Examination: October/November - 2025
Biochemistry (2309301)

Day & Date: Wednesday, 29-10-2025 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) One NADH is equal to _____ ATP.
   a) 1 b) 1.5
   c) 2 d) 2.5

2) _____inhibitor can bind only to free enzyme not to enzyme substrate complex.
   a) Competitive b) Uncompetitive
   c) Non-competitive d) Mixed

3) Gamma Amino Butyric Acid is produced by _____ reaction of glutamate.
   a) Transamination b) Deamination
   c) Decarboxylation d) Transketonation

4) _____ is composed of fructose and glucose.
   a) Sucrose b) Maltose
   c) Lactose d) Cellobiose

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

6) The enzyme enhances reactions rate by lowering _____ energies.
   a) Activation b) Binding
   c) Gibbs Free d) Free

7) ____ is a inhibitor of Cytochrome C oxidase which is a part of oxidative phosphorylation.
   a) Rotenone b) Cyanide
   c) Amythal d) Phenylalanine

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) Glycogen is synthesized from G6P mainly in the muscle and liver and stored within these tissues as _____.
2) Beta oxidation occurs primarily within _____.
3) A bond formed between the anomeric carbon atom of monosaccharide and the oxygen atom of alcohol is called _____.
4) The Watson Crick double helical structure is also refered to as __.

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

a) Write a note on Energy rich bond.
b) Draw neat, labeled, diagram of B-DNA.
c) Write a note on Ribozyme.
d) Write a note on cyclic AMP.
e) What is monosaccharides? Give its general formula.
f) Write a note on enzyme co-operativity.
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 Difference between A, B, Z-DNA.
c) Explain classification and nomenclature of Enzymes.
d) Write a note on metabolic regulation during hypoxia.

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

a) Describe in details glycolysis and give its energetics.
b) Explain Beta oxidation of fatty acid.
c) Explain Michaelis-Menten Equation of Enzymes catalysis.

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

a) Describe in details TCA cycle and give its energetics.
b) Explain in details biosynthesis of purines and pyrimidines.
c) Explain amino acid metabolism.

Seat No.	

Set | P

M.Sc. (Zoology) (Semester - III) (New) (NEP CBCS) Examination: October/November - 2025
Comparative Animal Physiology (2309302)

Day & Date: Friday, 31-10-2025 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) Which of the following animals exhibits direct gas exchange through its skin?
   a) Amphibians b) Reptiles
   c) Aves d) Mammals

2) In the most animals the primary role of hemoglobin is to Transport _____.
   a) Carbon dioxide b) Oxygen
   c) Nitrogen d) Sulfur

3) What type of circulatory system is present in Mollusks _____.
   a) Closed b) Open
   c) Mixed d) Linear

4) Trachea is respiratory organ of _____.
   a) Amphibians b) Aves
   c) Insects d) Mammals

5) Four chambered heart is present in _____.
   a) Spider b) Human
   c) Grasshopper d) Star Fish

6) Which of the following organ produces bile?
   a) Liver b) Lungs
   c) Pancreas d) Gall blader

7) _____ Is responsible for muscle contraction.
   a) Protein b) Calcium
   c) Amino Acids d) Phosphorous

8) _____ Is neurotransmitter responsible for initiating muscle contraction at the neuromuscular junction.
   a) Nucleases b) Acetylcholine
   c) Proteases d) TSH

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

1) Oxygen carrying blood pigment in certain Molluscan is _____.
2) Anaerobic respiration in animals produces _____.
3) When structure and function of cell changes, the process is called _____.
4) The shelled eggs first time observed in _____ during evolution.

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

a) Describe 2 types of neurohormones.
b) Define Thermoregulation.
c) Describe voluntary and involuntary muscles.
d) Diet and food specificity.
e) Hibernation in frog.
f) Patterns of nitrogen excretion.
g) Types of muscle proteins.
h) Name two respiratory pigments.

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

a) Describe Gastric digestion.
b) Communication in Bees.
c) role of rhopsin in visual cycle.
d) Osmoregulation in fresh water fishes.

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

a) Describe circadian rhythm.
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 sleep and Anesthesia.
b) Describe Thermoregulation in animals.
c) Describe Menstrual cycle.

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - III) (New) (NEP CBCS) Examination: October/November - 2025
Biostatistics (2309306)

Day & Date: Monday, 03-11-2025 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) Multiple choice questions. **08**

1) _____ is the median.
   a) Difference between higher half and lower half of the data set
   b) Mean of the highest and lowest number in a data sample
   c) Value separating higher half from the lower half of a data sample
   d) Difference between the highest and lowest number

2) In _____ of the central tendency measures magnitude of scores is included.
   a) Median b) Mode
   c) Mean d) Both median and Mode

3) The first two results of a central tendency test are _____
   a) Mean and Mode
   b) Median and Mode
   c) Mean, Median and Range
   d) Mean and Range

4) _____ one of the following statements about the correlation coefficient is correct.
   a) The correlation coefficient is unaffected by scale changes.
   b) Both the change of scale and the change of origin have no effect on the correlation coefficient.
   c) The correlation coefficient is unaffected by the change of origin.
   d) The correlation coefficient is affected by changes of origin and scale.

5) The degree of prefect positive correlation is _____.
   a) -1 b) +0.9
   c) +1 d) -0.9

6) The definition for probability is given by _____.
   a) Archimedes b) Einstein
   c) Euclid d) Simon Laplace

7) In a discrete probability distribution, the sum of all probabilities is always?
   a) 1 b) 0
   c) Undefined d) Infinite

8) What is the probability of an impossible event?
   a) 1 b) 0
   c) Insufficient data d) Not defined

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

1) Students t test used toto test population mean when population variance is always unknown and the sample size is _____
2) In regression analysis, the variable that is being predicted is the _____.
3) In general there are ____ lines of regression.
4) If A and B are mutually exclusive, then P(A ∩ B) = _____.

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

a) Significance of 't' test.
b) Define coefficient of variation.
c) Define mean and mode.
d) Write classical definition of Probability.
e) What is standard deviation.
f) Define Binomial distribution.
g) Write Elements of Probability.
h) Normal distribution.

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

a) Explain Measures of central tendency.
b) Write a note on Chi square test of goodness of fit.
c) Write method of studying correlation.
d) Explain Scatter diagram.

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

a) What is Karl Pearson coefficient of correlation? How will you interpret the value of 'r'?
b) Write properties of Binomial and Normal distribution.
c) A bag contains 30 balls numbered 1 - 30. One ball is drawn at random. Find the probability that the number of ball drawn will be a multiple of 5 or 7.

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

a) What is hypothesis testing? Explain the procedure of testing with example for large sample.
b) Explain probability distribution.
c) Explain in detailed one-way analysis of variation.

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - III) (New) (NEP CBCS) Examination: October/November - 2025
Bioinformatics (2309307)

Day & Date: Monday, 03-11-2025 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) 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) Proteomics primarily involves the study of: _____.
   a) Proteins b) DNA sequences
   c) Cell membranes d) Lipids

4) Which of the following techniques is used for sequencing nucleic acids?
   a) Chromatography
   b) PCR (Polymerase Chain Reaction)
   c) NMR spectroscopy
   d) DNA sequencing

5) Secondary structure prediction of proteins is mainly concerned with which of the following?
   a) The arrangement of amino acid side chains
   b) The 3D structure of the entire protein
   c) Alpha-helices and beta-sheets
   d) Protein-ligand interactions

6) The concept of OOPs (Object-Oriented Programming) in Java primarily focuses on: _____.
   a) Procedural programming
   b) Object creation and manipulation
   c) Data analysis
   d) Statistical modeling

7) BioJava is a library used in bioinformatics for: _____.
   a) Genetic engineering b) Structural biology
   c) Processing biological data d) Designing experiments

8) JDBC in Java is used to: _____.
   a) Create protein structures
   b) Connect Java applications with databases
   c) Predict drug efficacy
   d) Analyze protein-ligand interactions

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 questions (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 bioinformatics 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 application of bioinformatics?

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

a) Explain the methods used for tertiary 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) (Semester - IV) (New) (CBCS) Examination: October/November - 2025
Animal Biotechnology (2309401)

Day & Date: Tuesday, 28-10-2025 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 process of cutting the pre-mRNA to remove the introns and joining together of the exons is called _____.
   a) Capping b) PolyA tailing
   c) Splicing d) Editing

2) 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

3) The gene transfer technique involves a tiny needle that used to inject DNA into a cell lacking that DNA sequence is termed as _____.
   a) electroporation b) liposome transfer
   c) microinjection d) particle bombardment

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

5) Two bacteria found to be very useful in Genetic Engineering experiments are ____.
   a) *Nitrobacter & Azotobacter*
   b) *Rhizobium & Diplococcus*
   c) *Nitrosomonas & Klebsiella*
   d) *Escherichia & Agrobacterium*

6) A set of standards used to regulate own or community activity in relation to biological world is _____.
   a) Bioethics b) Biopotency
   c) Biowar d) Biopiracy

7) _____ is hybrid cell generated by implantation of a cell nucleus into denucleated cells during tissue culture.
   a) Somaclone b) Haploidy
   c) Hybrid d) Cybrid

8) 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

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

1) The cluster of genes which are under common regulatory process is called as _____.
2) First licensed drug produced through genetic engineering is _____.
3) The enzyme used to cut the DNA within a specific sequence is called as _____.
4) In the term of potency, early embryonic stem cells are _____.

Q.2 Answer Any Six from the following. **12**

a) Define the terms - i) intron and ii) exons
b) Describe the structure of m-RNA
c) Elist the components required in genetic engineering.
d) Write a note on gene targeting
e) Write a note on heterochromatin.
f) What is allelopathy? Give its significance.
g) What is transposable elements? Mention its types.
h) Give an account on cell lines in tissue culture technique.

Q.3 Answer Any Three from the following. **12**

a) What is protoplast fusion? Give its applications.
b) Explain the process of attenuation with suitable operon model.
c) Give a brief account on cell diversification in early embryo.
d) Write a note on biosafety levels used in research.

Q.4 Answer Any Two from the following. **12**

a) Discuss the process of transcription in prokaryotes.
b) Write a note on enzymatic method of nucleic acid sequencing.
c) Illustrate the steps in genetic engineering.

Q.5 Answer Any Two from the following. **12**

a) Give the applications of biotechnology in agriculture and medicine
b) What is northern blotting? Explain its method.
c) Explain in detail protoplast fusion technique and give its application.

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - IV) (New) (CBCS)
Examination: October/November - 2025
Zoo Keeping and Animal house Management (2309402)

Day & Date: Thursday, 30-10-2025 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 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

2) Which of the following is a non- venomous snake?
   a) Slender Coral Snake b) Common Krait
   c) Russell's Viper d) Reticulated Python

3) CZA stands for?
   a) Central Zoo Administration of India
   b) Counsil of Zoo Administration of India
   c) Central Zoo Authority of India
   d) None of the above

4) 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

5) Anthrax is caused by _____.
   a) *Bacillus anthracis* b) *Bacillus bovis*
   c) *Anthracis anthracis* d) *Clostridium perfringens*

6) Type of venom in Spectecled Cobra is?
   a) Hemotoxic b) Neurotoxic
   c) Cytotoxic d) None

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

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

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

1) Zoos are only for public entertainment.
2) Nightjar is a Nocturnal Bird.
3) There are 3 different species of Crocodiles in India.
4) Size of the enclosure is an important aspect while planning the zoo layout.

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

a) Define: Venom.
b) Define: Taxidermy.
c) Give 4 examples of Nocturnal birds.
d) Enlist 4 Ungulates kept in Zoo's.
e) What is significance of Zoo's in Public awareness?
f) Enlist the feeding material given to the Zoo birds.
g) Write the Causative agent and Diagnosis of Avian Influenza.
h) What is Animal House Management?

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

a) Write a note on: Animal House Management
b) Write a note on: Rabies
c) Write a note on: Wildcats of India
d) Write a note on: Nocturnal Birds

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

a) Enlist the rules and regulations for visitors in Zoo's.
b) Write a detailed note on: Housing and Feeding of Rabbits in zoo's
c) Write a detailed note on: Management of Birds of Prey in zoo's

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

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

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - IV) (New) (CBCS) Examination: October/November - 2025
Conservation Biology (2309405)

Day & Date: Saturday, 01-11-2025 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. (MCQ) **08**

1) National parks, wildlife sanctuaries and biosphere reserves are examples of _____.
   a) Molecular Biology b) Evolutionary Biology
   c) Conservation Biology d) Cell Biology

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

3) Following ____ is NOT a component of species diversity.
   a) Species richness b) Species evenness
   c) Genetic variability d) Relative abundance

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) The Allee effect refers to a phenomenon in _____.
   a) Population ecology b) Evolutionary biology
   c) Population genetics d) Molecular biology

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) The Bonn Convention focuses primarily on: ____.
   a) Marine pollution
   b) Conservation of wetlands
   c) Conservation of migratory species
   d) Deforestation control

8) The Convention on Biological Diversity (CBD) was signed at ____.
   a) Rio Earth Summit, 1992
   b) Kyoto Protocol, 1997
   c) Paris Agreement, 2015
   d) Stockholm Conference, 1972

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

1) Species richness refers to the number of different species present in a given area, community, or ecosystem. —
2) Gamma diversity refers to the species diversity within a specific area or ecosystem, usually a relatively small, homogenous site. -
3) Red Data Books are public documents that list and provide information on the conservation status of plant and animal species that are facing a risk of extinction.
4) The headquarters of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is in Africa

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

a) Define Conservation Biology.
b) Write formula of Shannon diversity index.
c) Define Predation and Parasitism.
d) What is keystone species.
e) Give any two characters of invasive species.
f) Give long form CITES and location of its head quarter.
g) What is satellite tracking of animal.
h) Define Sanctuary.

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

a) Write difference between Alpha and Gamma diversity.
b) Give an account on captive breeding of species.
c) Describe educational and scientific value of Biodiversity.
d) Write a note on Ramsar convention.

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

a) Describe the concept and significance of Shannon and Simpson diversity indices in conservation biology.
b) Describe the effect of global climate change on biodiversity.
c) What is human wild life conflict and give causes of HWC.

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

a) Describe the Allee effect and key stone species with examples.
b) Explain the threats of Biodiversity.
c) Give an account on international agreements of protected areas.

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - IV) (New) (CBCS) Examination: October/November - 2025
Environmental biology and toxicology (2309406)

Day & Date: Saturday, 01-11-2025 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) Which type of ecosystem is a lake?
   a) Terrestrial b) Lentic
   c) Lotic d) Agricultural

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

3) What does Minamata disease result from?
   a) Lead poisoning b) Mercury poisoning
   c) Pesticide exposure d) Thermal pollution

4) LD50 refers to _____.
   a) Lethal dose for 50% of population
   b) Lowest dose for safe consummation
   c) 50% reduction in toxicity
   d) Limit dosage

5) The Study of effects of poisons on living organism is called _____.
   a) Ecology b) Pharmacology
   c) Toxicology d) Pathology

6) The term 'biological control' refers to: _____.
   a) Use of chemicals
   b) Use of living organism for pest control
   c) Mechanical control methods
   d) Artificial manipulation of genetics

7) Which of the following is a greenhouse gas?
   a) Ozone b) Carbon dioxide
   c) Nitrogen d) Sulfur dioxide

8) Which of the following is an abiotic component of an ecosystem?
   a) Plants b) Animals
   c) Fungi d) Water

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

1) Bioaccumulation means the body breaks down toxins faster.
2) Mercury is a heavy metal with toxic effects on the nervous system.
3) All species in an ecosystem play equally important roles.
4) Ozon is the stratosphere protects life on earth from UV radiation.

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

a) Define Ecosystem.
b) What is population ecology?
c) Explain productivity in ecosystem in short.
d) Define ecology.
e) What is thermal pollution?
f) Write down symptoms of Minamata diseases.
g) Enlist biotic and Abiotic components of Ecosystem.
h) What are carcinogens and give any two examples.

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

a) Describe the concept and dynamics of an ecosystem.
b) Write a short note on thermal pollution.
c) Explain Carbon cycle.
d) Explain kinds of aquatic ecosystem.

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

a) Explain phosphorus cycle.
b) Define toxicology and explain classification of toxicants.
c) Describe the Management of green house.

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

a) Explain solid waste 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) (Semester - IV) (New/Old) (CBCS) Examination: October/November – 2025
Animal Biotechnology (MSC31401)

Day & Date: Tuesday, 28-10-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

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

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

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

2) The golden rice is able to produce _____ in their endosperm.
   a) insulin b) beta-carotene
   c) polygalactorunidase d) somatostatin

3) _____ is hybrid cell generated by implantation of a cell nucleus into denucleated cells during tissue culture.
   a) Cybrid b) Somatic hybrid
   c) Haploidy d) Myolema

4) DNA methylation requires _____ as a methyl group donor.
   a) S-Adenosyl methionine b) Formyl-tetrahydrofolate
   c) Carbon dioxide d) ATP

5) The process of cutting the pre-mRNA to remove the introns and joining together of the exons is called _____.
   a) editing b) splicing
   c) polyadenylation d) cleavage

6) First licensed drug produced through genetic engineering is _____.
   a) interferon b) insulin
   c) penicillin d) somatotropin

7) DNA sequencing method using the chemical is generally called as _____.
   a) Sanger-Coulson b) Maxam-Gilbert
   c) Enzymatic d) Dideoxy

8) The process of gene regulation by attenuation is observed in ____ operon.
   a) Lactose (*Lac*) b) Tryptophan (*Trp*)
   c) Galactose (*Gal*) d) Arabinose (*Ara*)

9) One of the following proteins is involved in transcription termination is _____.
   a) Rho b) Ras
   c) Raf d) Sigma

10) The mature blood cell without nucleus is _____.
   a) Lymphocyte b) Granulocytes
   c) Erythrocyte d) Monocyte

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

1) The enzyme used to cut the DNA within a specific sequence is called as _____.
2) Hematopoetic stem cells are present in _____ of long bones.
3) The RNA polymerase binding site upstream to coding sequence is called as _____.
4) In the term of potency, early embryonic stem cells are _____.
5) The triplets of nucleotides on mRNA specific for amino acids are called _____.
6) The DNA replication in cell cycle occurs during _____ phase.

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

a) Write a note on DNA methylation.
b) Outline the principle of southern blot and northern blot.
c) Discuss the structure of operon.
d) Give the applications of biotechnology in agriculture.

Q.3 Answer the following.

a) Explain in detail the Sanger's dideoxy method of DNA sequencing. **08**
b) Write a note on Ethical issues in human cloning. **08**

Q.4 Answer the following.

a) What is regulatory sequence? Explain in detail different regulatory sequences. **08**
b) Discuss in detail steps in genetic engineering. **08**

Q.5 Answer the following.

a) Write a note of check point proteins of cell cycle progression. **08**
b) Discuss in brief the post transcriptional mRNA processing in eukaryotes. **08**

Q.6 Answer the following.

a) Explain in detail somaclonal variation. Add a note on cell lines in tissue culture. **08**

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

Q.7 Answer the following.

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

b) What is stem cell? Explain in detail stem cell therapy. **08**

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - IV) (New/Old) (CBCS)
Examination: October/November - 2025
Applied Zoology (MSC31402)

Day & Date: Thursday, 30-10-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

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

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

1) _____ cell is primarily targeted for cryopreservation in assisted reproductive technologies.
   a) Red blood cells b) Sperm and oocytes
   c) Platelets d) Stem cells

2) _____ conditions can diagnose with the help of amniocentesis.
   a) Down syndrome b) Gestational diabetes
   c) Ectopic pregnancy d) Preterm labor

3) To create embryos outside the body for implantation is called as ____.
   a) IUI b) Ultrasound
   c) Surrogacy d) IVF

4) _____ hormone used to stimulate ovarian follicle development in IVF.
   a) Progesterone
   b) Luteinizing hormone (LH)
   c) Follicle-stimulating hormone (FSH)
   d) Human chorionic gonadotropin (hCG)

5) Which type of immunity is primarily involved when antigens are recognized by B cells?
   a) Innate immunity b) Cell-mediated immunity
   c) Humoral immunity d) Passive immunity

6) Which type of T cell is responsible for coordinating the immune response?
   a) Cytotoxic T cells b) Helper T cells
   c) Regulatory T cells d) Memory T cells

7) _____ are primarily responsible for the humoral immune response.
   a) T cells b) B cells
   c) Macrophages d) Natural killer cells

8) What is the structure of an immunoglobulin molecule?
   a) Single chain
   b) Dimer
   c) Tetramer
   d) Y-shaped with four polypeptide chains

9) A vaccine that uses genetic material to induce an immune response is called as _____.
   a) Inactivated vaccine b) Subunit vaccine
   c) DNA vaccine d) Live attenuated vaccine

10) The definitive host of *Tania Solium* is _____.
   a) Human b) Pig
   c) Apple snail d) Sheep

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

1) Cryopreservation technology used for the freezing of embryos for future use in IVF.
2) The conditions like Down syndrome can be diagnosed with the help of amniocentesis.
3) Subunits like protein particles used in DNA vaccines.
4) In gestational surrogacy surrogate carries an embryo created from the intended parents' egg and sperm.
5) *Eisenia fetida* is species of earthworm is commonly used in Vermiculture.
6) In IVF Sperm are artificially inserted in uterus.

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

a) Define the term IUI.
b) What is mean by surrogacy?
c) Define the Immunoglobulin.
d) Which is the definitive host of *Ascaris.*

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

a) Give a detail account on Amniocentesis.
b) Describe in brief the procedure of vermiculture.

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

a) What are the different types of cancer explain with suitable examples.
b) Give detail account of Immunoglobulin.

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

a) Write an essay on Biological warfare.
b) Write a note on polyclonal antibody production.

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

a) Explain the different type immunity and mention different types of immune cells.

b) Give the protocol of blood cell Storage in blood bank.

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

a) Write a note on IVF.

b) Describe the life cycle *of Ascaris lumbricoides.*

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - IV) (New/Old) (CBCS) Examination: October/November - 2025
Environmental Biology and Toxicology (MSC31403)

Day & Date: Saturday, 01-11-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

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

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

1) Which of the following is a component of the ecosystem?
   a) Population b) Energy flow
   c) Food web d) All of the above

2) Which type of ecosystem is a lake?
   a) Terrestrial b) Lentic
   c) Lotic d) Agricultural

3) What does Minamata disease result from?
   a) Lead poisoning b) Mercury poisoning
   c) Pesticide exposure d) Thermal pollution

4) Chernobyl is associated with which type of pollution?
   a) Thermal b) Radiation
   c) Noise d) Water

5) Which of the following is a greenhouse gas?
   a) Ozone b) Carbon dioxide
   c) Nitrogen d) Sulfur dioxide

6) What is the main source of energy in an ecosystem?
   a) Wind b) Water
   c) Sunlight d) Soil

7) Which of the following is a renewable resource?
   a) Coal b) Natural gas
   c) Solar energy d) Petroleum

8) Which of the following substances is considered a pollutant in the air?
   a) Nitrous oxide b) Ozone
   c) Hydrogen d) Sodium chloride

9) Which of the following is a major source of thermal pollution?
   a) Factories b) Pesticides
   c) Automobiles d) Power plants

10) What factor directly influences aquatic productivity?
   a) Temperature b) Light availability
   c) Oxygen concentration d) All of the above

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

1) The biogeochemical cycle is an example of the _____ flow of materials in an ecosystem.
2) Lotic ecosystems are characterized by _____ water.
3) Greenhouse management involves the control of _____.
4) _____ refers to the legislative control of pollution levels.
5) Carcinogens are substances that can cause _____.
6) FDA standards are related to the regulation of _____.

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

a) Describe the concept and dynamics of an ecosystem.
b) Discuss the productivity and mineral cycle in aquatic ecosystems.
c) What are the implications of thermal pollution?
d) Explain the management of greenhouse effect and polyhouse.

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

a) Discuss in detail the different types of ecosystems, with examples.
b) Explain the role of biological control in population ecology.

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

a) Describe the major environmental issues caused by industrial pollution, particularly in the textile and sugar industries.
b) Discuss the legislation and Indian standards for pollution control.

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

a) Explain in detail the causes, effects, and control measures for water pollution.
b) Give an account of the carbon credits system in urban trash management.

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

a) What are the different types of toxic agents? Discuss their effects on the human body.
b) Explain the role of soil toxicants in agriculture and household environments.

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

a) Discuss the methods of rainwater harvesting and its importance in natural resource conservation.
b) Describe the role of FDA standards in controlling food additives and carcinogens.

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - IV) (New/Old) (CBCS) Examination: October/November – 2025
Zoo keeping and Animal House Management (MSC31406)

Day & Date: Tuesday, 04-11-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

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

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

1) CZA stands for?
   a) Central Zoo Administration of India
   b) Council of Zoo Administration of India
   c) Central Zoo Authority of India
   d) None of the above

2) 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

3) 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

4) Type of Venom present in Spectacled Cobra is _____.
   a) Cytotoxic b) Hemotoxic
   c) Neurotoxic d) Phytotoxin

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

6) The Birds of Prey are also known as _____.
   a) Raptors b) Shoreline birds
   c) Canopy birds d) Ground nesting birds

7) Which of the following wildcat is not found in India?
   a) Lion b) Clouded Leopard
   c) Snow Leopard d) Jaguar

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

9) Which of the following is a non-venomous snake.
   a) Coral snake b) Krait
   c) Viper d) Python

10) ____ is a Nocturnal bird.
   a) Hawk b) Eagle
   c) Starling d) Nightjar

B) Write true / false **06**

1) Haffkin produces antivenom in India.
2) The purpose of Zoo is only to entertain people.
3) Feeding of Zoo animals by visitors is strictly prohibited.
4) The only way to say a person from snake bite is to use Anti-venom.
5) Vultures are also included in Birds of Prey.
6) Tuberculosis is caused by *Mycobacterium tuberculosis.*

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

a) Write a short note on: Significance of Zoo.
b) Write a short note on: Disinfection procedures in animal house.
c) Write a short note on: Rules and Regulations to be followed by visitors in Zoo's.
d) Enlist different types of Diurnal and Nocturnal birds.

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

a) Explain in detail Housing, Feeding and Breeding of Crocodiles in Zoo's.
b) Explain in detail Housing and Feeding of land birds in Zoo's.

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

a) Explain in detail Housing and Feeding of mammals in Zoo's.
b) Write a detailed note on: Elephant management.

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

a) Explain different types of common diseases seen in zoo animals.
b) Write a detailed note on: Management of Birds of Prey.

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

a) Write a detailed note on: Rodent management.
b) What are different types of wild cats? Explain housing of wild cats in zoo's.

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

a) Write a detailed note on: Taxidermy
b) Explain the difference used for identification of Venomous and Non-venomous snakes.

Seat No.	

Set **P**

M.Sc. (Zoology) (Semester - IV) (New/Old) (CBCS) Examination: October/November – 2025
Fishery Science (MSC31407)

Day & Date: Tuesday, 04-11-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

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

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

1) Following _____ is an example of marine water fish.
a) Labeo b) Silver fish
c) Tuna d) Catla

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 _____ adult major carp species has a relatively slender body and a more cylindrical shape.
a) Rohu b) Catla
c) Mrigal d) Silver carp

5) A _____ ecosystem refers to an aquatic environment where fresh water from rivers or streams mixes with salt water from the sea
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) Estrogen d) Adrenaline

7) _____ is a technique where multiple fish species are cultured together to utilize different ecological niches and maximize production.
a) Polyculture b) Monoculture
c) Aquaculture d) Pisciculture

8) Following _____ is NOT a method of fish preservation.
a) Freezing b) Canning
c) Dehydration 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 fresh environments.
2) Most freshwater fish species lay eggs (oviparous).
3) Anal fin is located near tail.
4) Phytoplankton 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 do not have 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 the difference between monoculture and polyculture.
d) Explain catadromous migration in fishes.

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

a) Describe characters of marine water fishes.
b) Describe culture techniques of major carps.

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

a) Describe role of plankton in fish culture.
b) Write a note on fish craft and gear.

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

a) Describe types of fish hatcheries.
b) Describe venomous glands in fishes.

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

a) Describe faunal diversity of fresh water ecosystem.
b) Describe economic importance of fishes.

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

a) Describe the fish preservation techniques.
b) Explain physiology of light production in fishes.

SLR-HS-25

Seat No.	

Set P

M.Sc. (Zoology) (Semester - III) (New) (NEP CBCS) Examination: October/November - 2025
Ecology and Ethology (MSC31311)

Day & Date: Thursday, 06-11-2025 Max. Marks: 80
Time: 11:00 AM To 01:30 PM

Instructions: 1) Q.No.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) The number of individuals belonging to same species live in same area is called _____.
   a) Community b) Ecosystem
   c) Population d) Biosphere

2) Producers in aquatic ecosystem are mainly _____.
   a) Zooplankton b) Phytoplankton
   c) Fish d) Decomposers

3) The pioneer species in primary succession on rock are usually _____.
   a) Lichens b) Mosses
   c) Ferns d) Shrubs

4) The ecological pyramid obtained from total living matter is called as _____.
   a) Pyramid of Energy b) Pyramid of biomass
   c) Pyramid of Food d) Pyramid of number

5) The final stable community in an ecological succession is called as _____.
   a) The final community b) The final Population
   c) The climax community d) the alternate Community

6) The changes of behaviour by life experience is called _____ behaviour.
   a) Imprinting b) Maturation
   c) Learning d) Stereotyped

7) A biological cycle, or rhythm, that approximately 24hr long is called as _____.
   a) Infradian b) circadian
   c) Circannual d) ultradian

8) The major pollutant in acid rain is _____.

a) CO_2 b) SO_2
c) NH_2 d) O_2

9) _____ devices used to determine location on earth.
   a) GPS (Global positioning system)
   b) Geographic internal data
   c) Global information system
   d) Generic information system

10) In an association between one population is benefited and other not affected is called as_____.
   a) Commensalism b) Mutualism
   c) Competition d) Protocooperation

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

1) Sun is the ultimate source of energy for the biosphere.
2) Mutualism is an association between both the individuals or population are benefited.
3) Secondary succession starts on bare rock.
4) Phosphorus is a gaseous nutrient.
5) Energy flow in an ecosystem is one-way.
6) Circadian rhythm is about 24 hours.

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

a) Explain abiotic components of ecosystem.
b) Describe types of energy pyramids.
c) What are ecotones?
d) Explain the term Stereotyped behaviour.

Q.3 Answer the following.

a) Explain nitrogen and phosphorus cycles. **10**
b) Write a note on types of animal behaviours. **06**

Q.4 Answer the following.

a) Explain different types of growth curves. **10**
b) Describe term population with its characteristics **06**

Q.5 Answer the following.

a) What is interspecific animal association, explain mutualism with suitable examples. **10**
b) Discuss community structure and species diversity. **06**

Q.6 Answer the following.

a) Explain causes and control of noise pollution. **10**
b) Discuss applications of remote sensing in ecology. **06**

Q.7 Answer the following.

a) Define biodiversity and explain patterns and threats of biodiversity. **10**
b) Write note on biological rhythms and orientation behaviour. **06**