S–6762

Sub. Code
23MZO1C1

M.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Zoology

STRUCTURE AND FUNCTION OF INVERTEBRATES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Filter feeding
2. Aim of ICBN
3. Coelomostome
4. Motile cilia
5. Extracellular digestion
6. Spiracles
7. Malphigian tubules
8. Coxal gland
9. Apodus larva
10. Microfilaria

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write short notes on Homonymy and Synonymy and their importance in binomial nomenclature.

Or

(b) What are taxonomic keys? Describe the principle and application of Dichotomous and Simple Bracket keys in taxonomic analysis.

12. (a) Discuss the mechanism of formation of coelom in eucoelomate animals and add a note on its function.

Or

(b) Describe the characteristics and structure of a cilia and mechanism of movement in Paramaecium.

13. (a) Discuss the structure and function of hemocyanin and chlorocruorin and the evolutionary significance of respiratory pigments.

Or

(b) Explain the mechanism of feeding and digestion in Hirudinaria.

14. (a) Give a brief account on excretion in annelids.

Or

(b) With a diagram describe the structure of a Green gland.

15. (a) Describe the general characteristics of Chaetognatha and Onychophora.

Or

(b) Discuss the structure and general characteristics of Echinopluteus larva.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. What are molecular markers? Give an account on molecular phylogenetics, types of molecular markers and their application in systematics.

17. Discuss the structure of water vascular system in starfish and explain the mechanism of hydrostatic movement.

18. How do insects breathe? Describe the insect tracheal system and its role in gas exchange.

19. Explain the structure of the nervous system of a prawn and its evolutionary significance.

20. Describe the structure and evolutionary significance of molluscan larvae.

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S–6763

Sub. Code
23MZO1C2

M.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Zoology

COMPARATIVE ANATOMY OF VERTEBRATES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Notochord
2. Neural crest cells
3. Ceruminous gland
4. Keratin
5. Foramen ovale
6. External respiration
7. Vertebral foramen
8. Mesonepbros
9. Apodus larva
10. Microfilaria

Part B

$(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Write short notes on the characteristic features of Agnatha with suitable examples.

Or

(b) Discuss the scope and importance of vertebrate morphology.

12. (a) What are horns? Explain their structure and types of horns found in vertebrates.

Or

(b) Explain the development and functions of nails in vertebrates.

13. (a) Discuss with a neat diagram the development of heart in Elasmobranchs.

Or

(b) Explain the structure of respiratory system of a bird.

14. (a) Give a brief account on (i) Amphistylic jaw suspension and (ii) Streprostylic jaw suspension.

Or

(b) With a diagram describe the structure of mammalian vertebrae.

15. (a) Describe the general characteristics of a sensory receptor and explain the types in mammals.

Or

(b) Discuss the structure and general characteristics of gustatory receptors in humans.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give an account on the phylogenetic relationship and adaptive radiations in tetrapods.

17. With a neat diagram explain the structure of human skin.

18. What are aortic arches? Describe the structure and evolution of aortic arches in mammals.

19. Discuss with diagrams the comparative anatomy of metanephric kidney in mammals.

20. Describe the anatomical structure and function of lateral line sense organ.

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S–6764

Sub. Code
23MZO1E1

M.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Zoology

Elective : MOLECULES AND THEIR INTERACTION RELEVANT TO BIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Non covalent interaction.
2. How do atoms become molecules?
3. Thermodynamic equilibrium.
4. Gibbs free energy.
5. Mucopolysaccharide.
6. Arachidonic acid.
7. Polymorphism in DNA.
8. Chemiosmotic hypothesis.
9. Oxidative phosphorylation.
10. miRNA.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the factor influencing the rate of reaction.

Or

(b) Explain the second order reaction with example.

12. (a) Describe the importance of biological compounds.

Or

(b) All interaction between atoms are electrical attractions between charges–Justify

13. (a) Explain the esters of fatty acid and polyhydric alcohol.

Or

(b) Write the chemical properties of amino acid.

14. (a) Describe the mechanism of oxidative phosphorylation.

Or

(b) Elaborate on the inhibitors of electron transport chain.

15. (a) Explain the four types of interaction in tertiary structure stabilization of globular protein.

Or

(b) Explain the stability of nucleic acid.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in details the molecular interaction and the types of intermolecular forces.

17. Describe the storage or structural polysaccharide.

18. Describe the quaternary structure of protein.

19. Describe the structural polymorphism of DNA.

20. Explain the stabilizing interaction of biomolecules.

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S–6765	Sub. Code
	23MZO1E2

M.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Zoology

Elective — BIOSTATISTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Null hypothesis
2. ANOVA
3. SPSS
4. Ogive curve
5. Types of data
6. Standard deviation
7. Median
8. Probability
9. Poisson distribution
10. Negative correlation

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Define the term "variable". Provide two detailed examples, one each of an independent and a dependent variable.

Or

(b) Explain the process of constructing a histogram and discuss its advantages over other graphical representations of data. Provide a real-world scenario where a histogram would be the most suitable graphical representation.

12. (a) Define standard error and its relationship with standard deviation. Provide a suitable example.

Or

(b) Explain the interpretation of standard deviation and its significance in analyzing data variability.

13. (a) Describe the characteristics of normal, binomial and poisson distributions. Briefly compare their applications.

Or

(b) On average, 10 customers arrive at a store every hour. What is the probability that exactly 15 customers arrive in the next hour? Analyse using Poisson distribution.

14. (a) Explain hypothesis testing. Describe paired sample t-test and mean difference t-test procedures with suitable examples.

Or

(b) Describe regression analysis. Explain computation of regression coefficients. With a biological data example.

15. (a) Describe the procedure for conducting two-way ANOVA. Explain how it is used to analyze the effects of two independent variables on a dependent variable.

Or

(b) Explain the significance of data analysis using statistical software like SPSS. Discuss the advantages of using SPSS for data analysis.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the different types of diagrams and graphs with suitable examples.

17. Find out the standard deviation of the marks secured by 10 students for following data.

S.No.	1	2	3	4	5	6	7	8	9	10
Mark	43	48	65	57	31	60	37	48	78	59

18. A coin is tossed 960 times. Head turned up 184 times. Find whether the coin is unbiased.

19. Define and elaborate on Karl Pearson's Co-efficient with an example.

20. What is SPSS? How is it helpful than calculating manually? Explain with an example stating the steps of calculation.

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S–6766

Sub. Code
23MZO1S1

M.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Zoology

INTELLECTUAL PROPERTY RIGHTS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Comment on biotechnology patents.
2. Give a note on biopiracy.
3. Expand (a) WTO (b) TRIPS.
4. What is a certification mark?
5. What is the role of USPTO?
6. What is protected under design act?
7. Give two examples of digital innovation.
8. Write short note on Email scams.
9. What is infringing?
10. What are the enforcement measures for IPR?

Part B $(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Write shortly on types of intellectual property rights.

Or

(b) Give a short note on the role of IPR in technological research.

12. (a) Brief on trade secrets.

Or

(b) Give a short note on the purpose and functions of trademarks.

13. (a) Write shortly on the TRIPS agreement under IPR.

Or

(b) Brief on geographical indication act.

14. (a) Briefly discuss some common methods used for digital content protection.

Or

(b) Write shortly on cyber security laws of India.

15. (a) Brief on trademark infringement.

Or

(b) Write a short note on emerging issues in the context of IPR.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give a detailed account of intellectual property rights in India and abroad.

17. Explain the aspects of registration of copyrights.

18. Explain the international treaties and conventions on IPRs in detail.

19. Give a detailed note on some common alleged forms of unfair competition.

20. Discuss some landmark cases and judgments related to Intellectual Property Rights in India and abroad.

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S–6767

Sub. Code
23MZO1A1

M.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Zoology

SERICULTURE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Tasar silk
2. Vanya silk
3. Ants well
4. Phylophagus insects
5. Voltinism
6. Fecundity
7. Chawki rearing
8. Rust leaf disease
9. Stifling
10. Reeling

Part B

$(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Enumerate the functions of CSB.

Or

(b) "Sericulture is an agrobased industry"–Explain in brief.

12. (a) Comment on preservation of mulberry leaf.

Or

(b) Give an account on leaf eating pests of mulberry.

13. (a) Outline of Holometabola of *Bombyx mori*.

Or

(b) Difference between diapause Eggs and Non – diapause Eggs.

14. (a) State the mode of infestation of dermestid and its control in silkworm.

Or

(b) Life cycle of *Nosema bombycis*.

15. (a) How the cocoon sorting is done?

Or

(b) Write a note on composition of silk. How different colours of mulberry cocoons are produced?

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Elucidate about the types of Silk Fibers.

17. Explain the vegetative methods of propagation of *Morus indica*.

18. Write an essay on anatomy of *Bombyx mori*.

19. Enumerate an account on life cycle of *Exorista bombycis*, prevention and control methods for silkworm

20. Elaborate about the physical and commercial characteristics of Cocoons.

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S–6768

Sub. Code
23MZO2C1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Zoology

CELLULAR AND MOLECULAR BIOLOGY

(CBCS –2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Eukaryotes.

2. Cell structure.

3. Passive transport.

4. Peroxisomes.

5. Macro molecules.

6. tRNA.

7. Receptors.

8. Transcription.

9. Oncogenes.

10. Tumor.

Part B

$(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Write about the diversity of cell shape and size.

Or

(b) Describe about the characteristic features of eukaryotes.

12. (a) Give an account on cell membrane.

Or

(b) Explain about electrical properties of membranes.

13. (a) Give an account on meiosis cell division.

Or

(b) Highlights the structure and functions of DNA.

14. (a) Describe about signaling pathway of membranes.

Or

(b) What is the general principle of cell communication?

15. (a) Discuss about metastasis.

Or

(b) Write about the features of normal and cancer cell?

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write a detailed account on cell organelles.

17. Discuss about regulations of cellular transport.

18. Distinguish membrane-associated receptors.

19. Write a note on G-protein coupled receptors.

20. Enumerate the traits of oncogenes and tumor suppressor genes.

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S–6769

Sub. Code
23MZO2C2

M.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Zoology

DEVELOPMENTAL BIOLOGY

(CBCS – 2022 & 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Epigenesis
2. Germarium
3. Amphimixis
4. Micropyle
5. Meridional plane
6. Gastrulation
7. Homeotic genes
8. Derivatives of ectoderm
9. Neoteny
10. Ecdysis

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write a short note on oogenesis in insects.

Or

(b) Comment on origin of germ cells.

12. (a) Give a shot account on capacitation in mammals.

Or

(b) Write a brief note on polyspermy.

13. (a) List out the factors affecting gastrulation.

Or

(b) Illustrate the mechanism of gastrulation in sea urchin.

14. (a) Briefly explain neurulation.

Or

(b) Write a short note on extra embryonic membrane in mammals.

15. (a) Give a brief account on metamorphosis.

Or

(b) Illustrate the mechanism of apoptosis.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write a detailed account on morphology of sperm.

17. Illustrate the mechanism and chemical reaction taking place during egg-sperm interaction.

18. Give a detailed account on patterns of cleavage.

19. Write an essay on organogenesis in mammals.

20. Discuss in detail about the cryopreservation of embryos and add a note on ethical issues in cryopreservation.

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S–6770

Sub. Code
23MZO2E1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Zoology

Elective : ECONOMIC ENTOMOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Beneficial insects
2. Honey
3. Silk
4. *Bombyx mori*
5. Insect Pest
6. *Apis mellifera*
7. Pest control methods
8. Integrated pest management
9. Human disease vectors
10. Anopheles

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Describe about insects and the biological success.

Or

(b) Write about basic concepts of taxonomy in insects.

12. (a) Write an essay on honey bees and types.

Or

(b) List out the methods of silk worm rearing.

13. (a) Give an account on types damage to plants by insects.

Or

(b) Describe about the pest of paddy.

14. (a) Write a note on control strategies of pest management.

Or

(b) Write an essay on merits and demerits of pest control.

15. (a) Describe about vectors and how its affect public health.

Or

(b) Enlist the vector control and preventive measures of human diseases.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss about insects and insect taxonomy.

17. Write an essay on social organization of beneficial insects.

18. Discuss about pest outbreak on rice.

19. Give an account of uses of pest resistant crop.

20. Elaborate on vectors of human diseases and control measures.

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S–6771

Sub. Code
23MZO2E2

M.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Zoology

Elective – RESEARCH METHODOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define pH

2. What is the basic concept of Colorimeter?

3. Define Bioinformatics.

4. What is Histology?

5. DIC.

6. Define Phase contrast.

7. What is the importance of Centrifuges?

8. Define blotting.

9. What is tracer techniques?

10. Animal Cell culture.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the following.

(i) Electrodes

(ii) pH Meter.

Or

(b) Discuss about GLP.

12. (a) Explain about Histochemistry and its Applications.

Or

(b) Write a short notes on Electron Microscopy.

13. (a) Describe about Confocal Microscopy.

Or

(b) Difference between Light Microscopy and Fluorescence Microscopy.

14. (a) Give an account on Electrophoresis.

Or

(b) Explain the following :

(i) ELISA

(ii) Blotting

15. (a) Give elaborate notes on Animal cell culture.

Or

(b) Write a short notes on Tracer techniques.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Give a detail account of Spectrophotometry.

17. Describe about Histology.

18. Explain in detail about Bright field and Phase Contrast.

19. Elaborate the Principle and advantages of Centrifuge.

20. Enumerate detail account of Tracer techniques in biology.

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S–6772

Sub. Code
23MZO2S1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Zoology

POULTRY FARMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define poultry farming.
2. Battery Cage System in Poultry Farming.
3. Insurance against what risk.
4. What is Layers?
5. Explain the feed formulation.
6. What is Brooders?
7. Define vaccination.
8. Fowl pox diseases.
9. What is hatching?
10. Define rearing.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Describe the preparation on poultry house.

Or

(b) Explain the preparation of shed before brooding.

12. (a) Write the production of egg.

Or

(b) How to manage the chicks?

13. (a) Write the animal feed formulation.

Or

(b) Describe the feeding of broilers.

14. (a) Explain any two viral diseases and its symptoms.

Or

(b) Write the management of poultry disease.

15. (a) Write short note on vaccination programme.

Or

(b) Discuss about management of hatchery waste.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write the different species of poultry farming.

17. Give an account on poultry production system.

18. Discuss about the marketing and cost of poultry farming.

19. Write an essay on poultry diseases.

20. Explain in detail about recycling of poultry waste.

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S–6773

Sub. Code
23MZO2A1

M.Sc. DEGREE EXAMINATION, APRIL 2025.

Second Semester

Zoology

APICULTURE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Worker bee.

2. Waggle dance.

3. Honey extractor.

4. Horizontal hive.

5. Colony collapse disorder.

6. Nosema.

7. Royal jelly.

8. Bee venom.

9. CBRTI.

10. Queen excluder.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Comment on the life cycle of queen bee.

Or

(b) Give an account on behavior patterns of honey bee.

12. (a) Why site selection is important in bee culture and factors affected it?

Or

(b) Explain the types of bee hive and briefly about the langs troth bee hive.

13. (a) Describe the bacterial diseases affecting honey bees.

Or

(b) What are the natural predators of honey bees? Elaborate on their control measures.

14. (a) How will you harvest honey from a colony? Summarize.

Or

(b) Briefly explain any four products of apiary and uses.

15. (a) Comment on the role of central bee research and training institute in India.

Or

(b) Discuss the development and importance of bee keeping in world agriculture.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give an account on the social organization of honey bees.

17. Explain in detail on bee keeping equipments.

18. Elaborate with suitable examples the parasitic infections of honey bees and their control measures.

19. Discuss the principle and procedures to be followed for post-harvest processing of apiculture products.

20. Substantiate apiculture as an entrepreneurial venture and its advantages.

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S–6774	Sub. Code
	23MZO3C1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Zoology

GENETICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

Define / comment.

1. Differentiate nucleoside and nucleotide.
2. Structure of t-RNA.
3. Facultative heterochromatin.
4. Solenoid structure of nucleosome.
5. Plasmid.
6. Lytic cycle.
7. Blue script vector.
8. Nucleic acid hybridization.
9. Liposome fusion.
10. Plantibodies.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the importance of Tm and cot values of DNA.

Or

(b) Give an account on Griffith's transformation experiment and its significance.

12. (a) Write the general properties of genetic code and mention the importance of Wobble hypothesis.

Or

(b) Explain the components of mitotic chromosomes.

13. (a) Write a short note on retroviruses.

Or

(b) Give an account on bacterial conjugation.

14. (a) Discuss about shuttle vector and its application in rDNA technology.

Or

(b) Give an account on DNA modifying enzymes.

15. (a) How gene gun works – Explain.

Or

(b) Explain the importance of reporter genes and marker genes in selection process.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss the Watson-Crick model of DNA and mention the unusual forms of DNA.

17. Explain the mechanisms causing chromosome variation and mention the syndromes associated with it.

18. Describe the transduction way of gene transfer and its importance.

19. Discuss the sequence of steps followed during successful gene cloning.

20. Explain the mechanism behind the agrobacterium mediated gene transfer method.

S–6775

Sub. Code
23MZO3C2

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Zoology

EVOLUTION

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Variation and its types.
2. Natural selection.
3. Abiotic synthesis.
4. What is the origin of basic biological molecules?
5. Paleozoic era.
6. How many stages in human evolution?
7. Molecular evolution
8. Homologous protein
9. Sympatric speciation
10. Convergent evolution.

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) What is neo-Lamarckism? Discuss.

Or

(b) Write a short note on spontaneity of mutation.

12. (a) Comment on the evolution of prokaryotes with suitable examples.

Or

(b) Elaborate on the photosynthesis and aerobic metabolism.

13. (a) Describe the evolutionary history of reptiles associated with mesozoic era.

Or

(b) Describe with suitable examples the origins of multicellular organisms.

14. (a) Elaborate the molecular tools in phylogenetic analysis.

Or

(b) Highlight the importance and consequence of gene duplication in evolution of proteins.

15. (a) Explain the concept of Hardy Weinberg law.

Or

(b) Discuss the importance of punctuated equilibrium on speciation citing suitable examples.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the consequences of observations made by Darwin in proposing his theory of natural selection.

17. Describe the experiment of Miller-Urey and its importance in understanding organic evolution.

18. Elaborate with suitable examples the major evolutionary events associated with Palaeozoic era.

19. Discuss the principle and procedures of bootstrapping in phylogenetic analysis and its application.

20. Explain in detail about the adaptive radiation with suitable examples.

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S–6776

Sub. Code
23MZO3C3

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Zoology

ANIMAL PHYSIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Haematopoiesis.
2. Cardiac cycle.
3. Anaerobic Respiration.
4. Respiratory organ in Amphibian.
5. Synapses.
6. Neurotransmitter.
7. Role of rods and cones in eye.
8. BMR.
9. Ectotherm.
10. Hyperthyroidism.

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Write an account on WBC and its types.

Or

(b) Explain about the functions of blood.

12. (a) Write an account on organization of lungs in birds.

Or

(b) Write a short note on respiratory chemoreceptors.

13. (a) Explain briefly about structure of neuron.

Or

(b) Give an account on refractive errors of eye.

14. (a) Write a short note on any three gastrointestinal hormones role in digestion.

Or

(b) Describe about the types of excretory products with examples.

15. (a) Give an account on adaptations in Endothermic animals.

Or

(b) Write a short note on significance of excretion.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail about the comparative anatomy of structure of heart.

17. Explain the process of transport of gases.

18. Describe the structure of eye.

19. Explain the mechanism of digestion in man.

20. Write an essay on any four endocrine glands and its function.

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S–6777

Sub. Code
23MZO3E1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Zoology

Elective – STEM CELL BIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define totipotency.
2. What do you mean by embryonic stem cell?
3. Define hematopoietic stem cell.
4. What are the organs involved in ectoderm lineages?
5. What is stem cell engraftment?
6. Define reprogramming.
7. Define the G phase.
8. What is senescence?
9. Define cell therapy.
10. What is Shwachman Diamond Syndrome?

Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) State the properties of stem cells.

Or

(b) Explain the future perspectives of stem cell biology.

12. (a) State the characterization of embryonic stem cells.

Or

(b) Write short notes on the organs of mesoderm lineages.

13. (a) Briefly describe the role of the yamanaka factor in induced pluripotent stem cells.

Or

(b) State the important sources and characterization of hematopoietic stem cells.

14. (a) Briefly describe about cell cycle.

Or

(b) Explain the role of stem cells in ageing.

15. (a) State the advantages and disadvantages of stem cell therapy.

Or

(b) Explain about the clinical outcomes of stem cell therapy.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write a detailed account of different types of stem cells.

17. Give a detailed account of organs of endoderm lineages.

18. Explain the various steps involved in producing induced pluripotent stem cells.

19. Write an essay on tissue repair and regeneration of adult cells.

20. Elaborate the application of stem cell therapy in the ailing various diseases.

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S–6778

Sub. Code
23MZO3S1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Zoology

DAIRY FARMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write any two advantages of dairying.

2. What is the difference between indigenous and exotic species?

3. How to feed cows in winter?

4. Which type of housing is best for dairy cattle?

5. What is roughage?

6. Write the mineral supplements of feedstuffs.

7. Mention any two reasons for milk spoilage?

8. Enlist few dairy products

9. What is contagious disease?

10. Mention few helminth diseases of cattle

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) How do you classify Indian breeds of cattle?

Or

(b) Enumerate the principles for dairy herd management.

12. (a) Explain the housing requirements of dairy animals.

Or

(b) How to build a model layout of dairy farms of various sizes?

13. (a) Explain protein rich concentrates of feedstuffs.

Or

(b) Write a note on feeding management in livestock.

14. (a) Write a short note on the composition of milk.

Or

(b) How does dairying bring additional income?

15. (a) Why is vaccination important in dairy cattle?

Or

(b) Illustrate the parasitic infestation in cattle.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on important exotic breeds of cattle and their characteristics.

17. Explain the management methods of milch animals during summer season.

18. Write an account on feeding of pregnant dairy animals.

19. What is the role of milk and milk products in human nutrition?

20. Write an essay on viral diseases of cattle.

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S–6779	Sub. Code
	23MZO3S2

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Zoology

MEDICAL LABORATORY TECHNIQUES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define bio-safety level.

2. Identify two good laboratory practice (GLP) for safe laboratory research.

3. Explain packed cell volume.

4. What are the main components of blood?

5. How does CT scan differ from MRI in terms of imaging technique?

6. Explain the mode of transmission of *Leishmania.*

7. What is cardiac shock?

8. Define Electroencephalogram.

9. What is the role of paraffin embedding in the preparation of tissue sections?

10. What types of blades are used in ultramicrotome?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the proper disposal method for biomedical waste to minimize environmental and health risks.

Or

(b) How does junk food consumption influence metabolic health?

12. (a) How is hemoglobin concentration determined in a blood sample, and why is it a critical parameter in diagnosis of anemia?

Or

(b) Briefly explain the causes, symptoms and treatment strategies for hemolytic anemia.

13. (a) How does Plasmodium cause malaria, and what are the primary symptoms associated with this disease?

Or

(b) Explain the significance of treadmill test in cardiovascular assessment.

14. (a) Briefly, discuss the intrinsic and extrinsic factors that regulate heart rate.

Or

(b) Explain the principle of ultrasonography and its application in diagnosing cardiovascular disease.

15. (a) Explain the steps involved in block preparation process and its importance in histological analysis.

Or

(b) Briefly discuss the advantages and limitations of using frozen sections in diagnostic pathology.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Elaborate in detail the health hazards associated with tobacco use, including smoking and chewing tobacco and the available cessation strategies.

17. Describe in detail the intrinsic and extrinsic pathway of blood coagulation.

18. Describe the life cycle of *Entamoeba histolytica* and its impact on human health.

19. Explain in detail the working principle of PET scan and its application in oncology

20. Discuss in detail the various staining methods used in histopathology its applications and limitations.

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S–6780

Sub. Code
23MZO3A1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Zoology

VERMICULTURE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define detritus feeder.

2. Comment on *Eisenia fetida*.

3. Explain Downward-Migration Method.

4. Differntiate detritivore and omnivore.

5. Explain the vermibed.

6. Write the advantages and disadvantages of roof shed method.

7. Define organic farming.

8. List out the composition of vermicompost.

9. Comment on transport of vermicompost.

10. List out the constraints of vermiculture.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write the history and growth of vermitechnology in India.

Or

(b) Describe the external morphology of earthworm with diagram.

12. (a) List out the important traits of earthworm species selection.

Or

(b) Differentiate endogeic and anecic earthworms with examples.

13. (a) Explain the merits and demerits of field pit method.

Or

(b) Explain the top fed windrows method for vermicomposting.

14. (a) Discuss the recent biotechnological intervention in vermitechnology.

Or

(b) Give an account on uses of vermicompost in fisheries.

15. (a) Explain the marketing channel for vermiculture products.

Or

(b) List out the important soil quality parameters that related to vermicompost.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the earthworm's reproductive system, copulation and cocoon formation.

17. Discuss the merits and demerits of monoculture and polyculture methods.

18. Explain the vermicompost harvesting and storage techniques.

19. Discuss the preparation method and applications of vermicasting.

20. How earthworm helpful for agriculture and green environment — Explain with examples.

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S–6781	Sub. Code
	23MZO4C1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Zoology

IMMUNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define adaptive immunity.

2. List out the internal defence System.

3. Define epitope and paratope.

4. What is opsonisation?

5. Explain about agglutination.

6. What is immunoglobulin?

7. Define anaphylaxis.

8. Difference between B Cell and T Cell.

9. Define graft rejection.

10. What is immunization?

Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Write a short note on scope of immunology.

Or

(b) Difference between cellular and humeral immunity.

12. (a) Write the characteristic features of Antigens.

Or

(b) Draw a neat structure of immunoglobulin and label it.

13. (a) Mention about Antigen presenting Cells.

Or

(b) Write a short note on major Histo Compatability molecules.

14. (a) Explain about complement System.

Or

(b) Write short note on Monoclonal Antibody.

15. (a) What is hyper sensitivity? Explain its type.

Or

(b) Mention some Autoimmune deficiency diseases.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Give an account on the types of immune system.

17. Describe in detailed about antigen.

18. What is antibody? Explain about their classes with biological significance.

19. Write an eassay on primary and secondary Immune response.

20. Discuss about Vaccines.

S–6782

Sub. Code
23MZO4C2

M.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Zoology

ECOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define biotic.

2. What is the basic concept of Niche?

3. Define Population growth curve.

4. What is concept of metapopulation?

5. Pollination.

6. Define Community ecology.

7. What is the importance of mineral cycling?

8. Define Biogeography.

9. Define Project Tiger.

10. What are the changes of Biodiversity?

Part B

$(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Explain about Physical Environment.

Or

(b) What is the difference between biotic and abiotic?

12. (a) Write a short notes on characteristics of a Population.

Or

(b) Discuss the concept of Meta population.

13. (a) Give an account on Species interactions and its types.

Or

(b) Describe about Pollination and Symbiosis.

14. (a) Give elaborate notes on the structure of Ecosystem and its Functions.

Or

(b) Explain the following.

(i) Terrestrial Ecosystem

(ii) Aquatic Ecosystem.

15. (a) Briefly explain the Environmental Pollution.

Or

(b) Add a brief note on the Waste Management.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Give a detail account of biotic and abiotic interactions.

17. Explain the action taken to control population explosion in detail.

18. Give elaborate notes on Ecological Succession.

19. Discuss about Biogeography in ecosystem elaborately.

20. Give an elaborate note on global environmental change.

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S–6783

Sub. Code
23MZO4E1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Zoology

Elective : AQUACULTURE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Metahaline
2. Secchi disc
3. Microalgae
4. Major carps
5. Intensive culture methods
6. List out edible oysters
7. Dropsy
8. Viral Haemorrhagic Septicaemia (VHS)
9. CIFA
10. CMFRI

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Write a short note on control of predators, parasite and weeds in culture pond.

Or

(b) Illustrate the construction of culture pond and mention their types.

12. (a) Write a short note on major carps of India.

Or

(b) Give a brief account on formulation of fish feed and feeding methods.

13. (a) Write a short note biofloc technology.

Or

(b) Comment on brackish water aquaculture.

14. (a) Give a short account on shrimp diseases.

Or

(b) Explain non-infectious diseases of fishes.

15. (a) Give a short note on oviparous and viviparous fishes.

Or

(b) Comment on various aquaculture research organization.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give a detailed account on types of aquacultures.

17. Discuss in detail about the live feeds.

18. Write a detailed account on crab culture.

19. Give an account on fungal diseases in fishes.

20. Write an essay on the types of ornamental fishes.

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S–6784

Sub. Code
23MZO4S1

M.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Zoology

ANIMAL BEHAVIOUR

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define genetic variations.
2. What is Altruism?
3. Define intrasexual selection.
4. What is Orthokinensis?
5. Define Homeostasis.
6. Define acquisition.
7. State the foraging behaviour in honeybees.
8. What is a biological clock?
9. Define chronomedicine.
10. Define the law of independent assortment.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Briefly explain the polygenic inheritance with an example.

Or

(b) Write short notes on the Darwinian fitness.

12. (a) Explain the phenomenon of sexual selection.

Or

(b) Write short notes on visual adaptations of animals to an unfavourable environment.

13. (a) Briefly describe the animal's behaviour in a changing environment.

Or

(b) Describe the cognitive aspects of learning.

14. (a) Write a brief note on Instinct and learning.

Or

(b) Briefly describe the mechanism of decision-making.

15. (a) Briefly describe the concepts of the Central clock system.

Or

(b) Explain how photoreception helps in animal behaviour.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write a detailed account of the evolution of adaptive strategies in animal behaviour.

17. Explain how an animal's behaviour is governed by neural control.

18. Describe in detail the biological aspects of learning.

19. Explain about non-verbal communication of human.

20. Give a detailed account of Circadian rhythm with a special reference to *Drosophila.*

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S–6785	Sub. Code
	23MZO4A1

M.Sc. DEGREE EXAMINATION, APRIL 2025.

Fourth Semester

Zoology

BIO-COMPOSTING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define bio composting

2. What is compost and how it is made?

3. Write any two advantages of ground heaps?

4. What is batch method of bio composting?

5. How to prepare bio compost pit?

6. What is soil amendment?

7. How soil fertility is maintained?

8. Give examples for waste minimization

9. What is a bio compost unit?

10. What is bin system of bio composting?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Enlist the benefits of bio composting.

Or

(b) Explain anaerobic type of bio composting.

12. (a) How does a tank ferment organic material?

Or

(b) Write a note on large scale bio composting technology?

13. (a) Explain the soil amendments used to enrich soil.

Or

(b) How to prepare bio compost bed?

14. (a) What is the role of bio compost in plant growth promotion?

Or

(b) Explain the value added products obtained from bio composting.

15. (a) Explain the establishment of small bio compost unit.

Or

(b) What are the objectives of bio compost project?

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an account on the ecological importance of bioocomposting?

17. Explain batch and continuous method of bio composting

18. Explain the organic amendments

    (a) Peat mass

    (b) Lomi dirt

19. Write an essay on bio composting in waste reduction?

20. Explain the role of self help groups in generating employment by bio composting

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