R0228	Sub. Code 509101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Zoology

STRUCTURE AND FUNCTIONS OF INVERTEBRATES

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which of the following organisms is an example of a triploblastic animal (CO1, K1)

   (a) Cnidarians (b) Roundworms

   (c) Sponges (d) Ctenophores

2. Among the following organs, one is not a characteristic of the Insecta (CO1, K4)

   (a) Parapodia

   (b) Three pairs of legs

   (c) Jointed appendages

   (d) Chitinous exoskeleton

3. Tube feet are found in (CO2, K3)

   (a) Starfish (b) Cuttlefish

   (c) Crayfish (d) Jellyfish

4. The following acts as a locomotory organ in earthworms (CO2, K4)

(a) Pineal setae (b) Cilia

(c) podia (d) body setae

5. Excretory organs of flat worms are called (CO3, K1)

(a) Protonephridia (b) Green gland

(c) Flame cells (d) Malpighian tubules

6. Cnidarians, that exhibit only polyp stage (CO3, K2)

(a) Cubozoa (b) Scypozoa

(c) Anthozoa (d) Hydrozoa

7. Which one of the following does not have two hosts to complete their life cycle? (CO4, K2)

(a) Ascaris (b) Tapeworm

(c) Liver Fluke (d) Planaria

8. ———————— is known as a living Fossil (CO4, K2)

(a) Peripatus (b) Mosquitoes

(c) Earthworm (d) Sea anemone

9. Insect exoskeleton is made up of (CO5, K2)

(a) keratin (b) Chitin

(c) Pectin (d) Cellulose

10. Flagellated cells, that line the spongocoel in poriferans are referred to as (CO5, K1)

(a) Ostia (b) Mesenchymal cell

(c) Oscula (d) Choanocytes

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Write a short note on binomial nomenclature. (CO1, K1)

Or

(b) Briefly discuss about symmetry in animals. (CO1, K2)

12. (a) Draw the ultra-structure of cilia and describe ciliary movement. (CO2, K3)

Or

(b) Enumerate the differences between autotrophic and heterotrophic nutrition. (CO2, K4)

13. (a) Write a short account on the respiratory pigments in invertebrates. (CO3, K1)

Or

(b) Give a short account on the sensory system of invertebrates. (CO3, K2)

14. (a) Briefly mention about the parasitic adaptations of invertebrates. (CO4, K1)

Or

(b) Discuss about the significance of living fossils. (CO4, K5)

15. (a) Write a note on the integumentary system of Mollusca. (CO5, K2)

Or

(b) Discuss about the advantages and disadvantages of invertebrate exoskeleton. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Discuss about the development of coelom and acoelomate organization with examples. (CO1, K5)

Or

(b) Give a detailed account of colonization and organization of germ layers. (CO1, K1)

17. (a) Write elaborately about the movement and locomotory organs of invertebrates. (CO2, K4)

Or

(b) Explain about the different types of digestion and digestive system in invertebrates. (CO2, K4)

18. (a) State the differences in the respiratory organs of invertebrates. (CO3, K2)

Or

(b) Describe about the neuroendocrine system in invertebrates. (CO3, K1)

19. (a) List out any three parasitic adaptations and their life cycle patterns in phylum Platyhelminthes. (CO4, K5)

Or

(b) Discuss about the invertebrate model organisms used in the laboratory and their importance. (CO4, K1)

20. (a) Give a detailed account of integumentary systems and their evolutionary significance. (CO5, K2)

Or

(b) Write an essay on the adaptive radiation in non-chordates. (CO5, K2)

———————

R0229	Sub. Code 509102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Zoology

COMPARATIVE ANATOMY OF VERTEBRATES

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** the following objective questions by choosing the correct option.

1. Apomorphy is a _____ that has been evolved from its ancestral form. (CO1, K1)

   (a) Family (b) Genus

   (c) Species (d) Evolutionary trait

2. The binomial nomenclature system was introduced by (CO1, K1)

   (a) Charles Darwin (b) Carolus Linnaeus

   (c) Louis Pasteur (d) Ivan Pavlov

3. Cartilaginous fishes have ———————— scales (CO2, K3)

   (a) Ctenoid (b) Placoid

   (c) Ganoid (d) Cycloid

4. Number of cranial nerve pairs in Pisces (CO2, K2)

   (a) Ten (b) Thirteen

   (c) Eleven (d) Twelve

5. The large poison-secreting gland in the common toad is (CO3, K4)

(a) Parotoid (b) Pituitary

(c) Thyroid (d) Salivary gland

6. The venom of Cobra is (CO3, K3)

(a) Neurotoxic (b) Haemotoxic

(c) Chemotoxic (d) Nephrotoxic

7. Class Mammalia is broadly divided into _____ sub-classes. (CO4, K1)

(a) Three (b) Four

(c) Five (d) Two

8. In birds, the jaws are elongated into a toothless (CO4, K4)

(a) Beak or bill (b) Teeth

(c) Claw (d) Nostril

9. The functions of air sacs in birds (CO5, K5)

(a) Unidirectional airflow

(b) Bidirectional flow

(c) No airflow

(d) None of these

10. The wave of contraction in the Mammalian heart originates from (CO5, K3)

(a) Superior vena cava

(b) inferior vena cava

(c) Sinuauricular node

(d) Purkinje fibres

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Give a brief account of the binomial nomenclature. (CO1, K2)

Or

(b) Explain species concept and clade. (CO1, K1)

12. (a) What is osmoregulation? Explain in brief with examples. (CO2, K1)

Or

(b) Discuss in brief about the retrogressive metamorphosis in Urochordata. (CO2, K2)

13. (a) Give a brief account of the adaptive features of Anura. (CO3, K4)

Or

(b) Give a short account of the general character of the Amphibians. (CO3, K5)

14. (a) Explain briefly about the fossil history of birds. (CO4, K2)

Or

(b) List out the structural peculiarities of Prototheria compared to Eutheria. (CO4, K1)

15. (a) Draw the structure of the brain in amphibians. (CO5, K2)

Or

(b) Give a brief account on the mammalian heart. (CO5, K1)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Discuss about the numerical and molecular taxonomy. (CO1, K4)

Or

(b) Give a detailed account of the morphological and evolutionary classification of the vertebrates. (CO1, K1)

17. (a) Explain about the affinities of primitive chordates in detail. (CO2, K1)

Or

(b) Give a detailed account of the migration of fishes. (CO2, K2)

18. (a) Write a detailed note on the parental care for amphibians. (CO3, K1)

Or

(b) Illustrate the differences between the poisonous and non-poisonous snakes of South India for identification. (CO3, K3)

19. (a) Explain the different types of migration in birds and the factors influencing migration. (CO4, K2)

Or

(b) Give a detailed account on dentition in mammals. (CO4, K1)

20. (a) Critically analyze the comparative difference in the digestive system of vertebrates. (CO5, K4)

Or

(b) Outline the differences in the structure and functions of the respiratory system in vertebrates. (CO5, K3)

R0230	Sub. Code 509103

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Zoology

BIOCHEMISTRY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. The number of ATPs produced during Glycolysis is (CO1, K4)

   (a) 4 ATP (b) 2 ATP

   (c) 5 ATP (d) 3 ATP

2. The synthesis of glucose from non-carbohydrate precursors is called (CO1, K2)

   (a) Glycolysis (b) Krebs cycle

   (c) Gluconeogenesis (d) none of these

3. These are the sulphur-containing amino acids (CO2, K1)

   (a) Methionine (b) Phenylalanine

   (c) Tryptophane (d) Histidine

4. The most common example of zwitterion is (CO2, K1)

(a) Carbohydrates (b) Lipids

(c) Amino acids (d) none of these

5. The rancidity of lipids of lipid-rich foodstuffs is because of (CO3, K2)

(a) Reduction of fatty acids

(b) Hydrogenation

(c) Dehydrogenation

(d) Oxidation

6. This is an example of derived lipids (CO3, K2)

(a) Terpenes (b) Steroids

(c) Carotenoids (d) All of the above

7. If the DNA strand has nitrogenous base sequence ATTGCC, the mRNA will have? (CO4, K3)

(a) ATTGCA (b) UGGACC

(c) UAACGG (d) ATCGCC

8. The left-handed coiled DNA is called as (CO4, K1)

(a) A DNA (b) B DNA

(c) Z DNA (d) None of these

9. This vitamin deficiency causes night blindness (CO5, K4)

(a) Vitamin D (b) Vitamin C

(c) Vitamin E (d) Vitamin A

10. The functional enzyme is (CO5, K1)

(a) Apoenzyme (b) Coenzyme

(c) Holoenzyme (d) none of these

Part B (5 × 5 = 25)

Answer **all** the questions, not more than 500 words each.

11. (a) Discuss briefly about the glycolytic pathway. (CO1, K2)

Or

(b) Give a short account on the HMP shunt. (CO1, K1)

12. (a) Illustrate the structure of haemoglobin. (CO2, K2)

Or

(b) Give a short note on Ramachandran plot. (CO2, K1)

13. (a) What are the biological importance of lipids? (CO3, K5)

Or

(b) Give a brief account of lipolysis. (CO3, K1)

14. (a) Draw the structure of DNA. (CO4, K2)

Or

(b) Give a short account on the role of RNA. (CO4, K4)

15. (a) Explain the derivation of the Michalis-Menten equation. (CO5, K2)

Or

(b) Give an account of water-soluble vitamins. (CO5, K1)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Discuss about the TCA cycle and its significance. (CO1, K1)

Or

(b) Give an account on the classification, properties, and biological importance of carbohydrates (CO1, K4)

17. (a) Describe the primary, secondary, tertiary, and quaternary structure of proteins (CO2, K2)

Or

(b) Explain about the different types of protein metabolism (CO2, K2)

18. (a) Describe the lipid classification and discuss their properties. (CO3, K2)

Or

(b) Evaluate the importance of β-oxidation of lipids. (CO3, K5)

19. (a) Compare the role of DNA and RNA in protein synthesis. (CO4, K4)

Or

(b) Write an elaborate account of nucleic acid metabolism. (CO4, K4)

20. (a) Give an account of the types, classification, and properties of enzymes. (CO5, K4)

Or

(b) Discuss about the importance of vitamins along with their classification and function. (CO5, K2)

———————

R0231	Sub. Code
	509104

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Zoology

CELL AND MOLECULAR BIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. The cell theory was proposed by (CO1, K1)
   (a) Schleiden and Schwann
   (b) Giovanni Morgagni
   (c) Darwin
   (d) Mendel

2. The specialized cell junctions are abundant in ————. (CO1, K1)
   (a) Cardiac cells (b) Prokaryotic cells
   (c) Hepatic cells (d) Epithelial cells

3. This organelle is called the powerhouse of the cell (CO2, K2)
   (a) Mitochondria (b) Cytoplasm
   (c) Lysosome (d) Nuclei

4. Father of modern cell biology (CO2, K1)

(a) George N. Papanicolaou

(b) George Emil Palade

(c) Robert Hooke

(d) None of the above

5. DNA is stored in which of the following cell organelles? (CO3, K1)

(a) Cell wall

(b) Cell Membrane

(c) Nucleus

(d) Cytoplasm

6. The Gap junctions are absent in (CO3, K2)

(a) Blood cells (b) Brain cells

(c) Hepatocytes (d) Cardiac cells

7. A cell organelle that is present in animal cells but absent in plant cells. (CO4, K1)

(a) Cytoplasm (b) Centrosome

(c) Mitochondrial (d) Golgi complex

8. Point mutation involved in (CO4, K2)

(a) Deletion

(b) Duplication

(c) Insertion

(d) Change in single base pair

9. Which of the following cells in humans lack the nucleus? (CO5, K4)

(a) Red blood cells (b) Muscle cells

(c) Skin cells (d) Nerve cells

10. The cancer cells spread to other regions of the body through (CO5, K4)

(a) Infiltration (b) Gene splicing

(c) Metastasis (d) None of these

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

Answer **all** the questions, not more than 500 words each.

11. (a) Draw the structure of mitochondria in animal cells. (CO1, K4)

Or

(b) Write a short account of the significance of the cell nucleus. (CO1, K5)

12. (a) Write briefly about the G1 and G2 phases of the cell cycle. (CO2, K1)

Or

(b) Discuss briefly about cell-cell interactions. (CO2, K2)

13. (a) Give a short account of leading and lagging strands during DNA replication. (CO3, K4)

Or

(b) Explain briefly about the role of ribosomes in cellular function. (CO3, K3)

14. (a) Briefly discuss about any two types of cell signaling. (CO4, K2)

Or

(b) Write short notes on secondary messengers. (CO5, K1)

15. (a) Discuss about chromosomal aberrations. (CO5, K1)

Or

(b) Briefly discuss about cancer and carcinogens. (CO5, K2)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Describe the types, structure, and functions of the endoplasmic reticulum. (CO1, K4)

Or

(b) Explain the molecular mechanism of the membrane transport system. (CO1, K2)

17. (a) Discuss about apoptosis, necrosis, and their regulation. (CO2, K1)

Or

(b) Enlist the characters of embryonic and adult stem cells along with their significance. (CO2, K4)

18. (a) Give a detailed account on different types of RNAs and their role in protein synthesis. (CO3, K5)

Or

(b) Discuss the transcriptional and post-transcriptional control in eukaryotes. (CO3, K2)

19. (a) Give a detailed account of the cell signaling along with cell surface receptors. (CO4, K2)

Or

(b) Describe the mechanism of bacterial chemotaxis and quorum sensing. (CO4, K3)

20. (a) Give a detailed account of transposable genetic elements in eukaryotes and prokaryotes. (CO5, K4)

Or

(b) Write a detailed account of the tumour suppressor genes, their activation, and suppression. (CO5, K2)

———————

R0232	Sub. Code
	509502

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Zoology

Elective : ANIMAL CELL CULTURE TECHNOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Human cloning comes in the realm of (CO1, K5)

   (a) Biosafety (b) Bioethics

   (c) Medicine (d) None of these

2. Name the type of culture that is prepared by inoculating directly from the tissue of an organism to culture media (CO1, K4)

   (a) Primary cell culture

   (b) Secondary cell culture

   (c) Cell lines

   (d) None of these

3. A cell line is a (CO2, K2)

   (a) Multilayer culture

   (b) Transformed cells

   (c) Multiple growths of cells

   (d) Subculturing of primary culture

4. The cell line of human cervical carcinoma is (CO2, K1)

(a) HeLa (b) WISH

(c) L (d) MRC-5

5. The following are methods of sterilization except (CO3, K4)

(a) Dry heat sterilisation

(b) Autoclaving

(c) Sterilization by filters

(d) Laminar airflow

6. Exposure to pathogenic microbes is a contributing factor for ———————— (CO3, K3)

(a) Chemical risk (b) Biohazards

(c) Physical risk (d) Personnel risk

7. Which potential application of animal cell culture involves the production of human tissues for transplantation? (CO4, K1)

(a) Drug discovery and development

(b) Vaccine production

(c) Tissue engineering

(d) Basic research

8. Which of the following is not a type of animal cell culture technique? (CO4, K4)

(a) Monolayer culture

(b) Suspension culture

(c) Organotypic culture

(d) Microarray analysis

9. Cell culture technique became simpler only after the advent of (CO5, K5)

(a) Antibiotics

(b) Trypsin

(c) Cell culture media

(d) All of the following

10. The transplantation of a pig heart to a human is (CO5, K1)

(a) Autograft (b) Allograft

(c) Xenograft (d) None of these

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

Answer **all** the questions not more than 500 words each.

11. (a) Write a short note on the biology of culture cells. (CO1, K1)

Or

(b) Explain about the aseptic techniques used in the animal cell culture lab. (CO1, K2)

12. (a) What is the composition of complete media? (CO2, K2)

Or

(b) Give a short account of the importance of serum in culture media. (CO2, K2)

13. (a) Write a short note on primary cell culture and its disaggregation. (CO3, K3)

Or

(b) Briefly explain about cloning. (CO3, K5)

14. (a) Give a short account on the study of cell viability analysis. (CO4, K2)

Or

(b) Briefly discuss about haematopoietic stem cells. (CO4, K2)

15. (a) Write a short note on Cervical tumour cell lines. (CO5, K2)

Or

(b) Give an account on histotypic cultures. (CO5, K1)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Discuss about advantages and limitations of animal cell culture. (CO1, K4)

Or

(b) Describe about the laboratory design, layout, equipment, substrates, and other requirements for the animal cell culture lab. (CO1, K5)

17. (a) Write about the methods used for the immortalization of the culture cell lines. (CO2, K3)

Or

(b) Give an account of the preservation and quantification of cell lines along with the disposal methods used for the contaminated culture. (CO2, K3)

18. (a) Write about the significance of serum-free media and its types. (CO3, K5)

Or

(b) Explain about the preparation, sterilization, and storage of culture media. (CO3, K2)

19. (a) Discuss about the different types of cytotoxicity assays used for the cell viability analysis and their significance. (CO4, K4)

Or

(b) Explain the methods used for the culture of specialized cell lines such as mesenchymal and neuroectodermal cells. (CO4, K2)

20. (a) Give an account of the culture of tumour cell lines. (CO5, K3)

Or

(b) Discuss about the three dimensional cell culture and its significance. (CO5, K3)

———————

R0233	Sub. Code
	509301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Zoology

GENETICS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the objective questions by choosing the correct option.

1. Gene type of the dominant plant can be determined by (CO1, K2)

(a) Pedigree analysis (b) Back cross

(c) Test cross (d) Dihybrid cross

2. Which is the genotype of blood group A (CO1, K2)

(a) $I^A I^A$ (b) $I^A I^O$

(c) $I^A I^B$ (d) $I^A I^A$ or $I^A I^O$

3. In males, the gene for colour blindness is located in ———————. (CO2, K2)

(a) X-Chromosomes (b) Y-Chromosomes

(c) Both X and Y (d) Either X or Y

4. Euploidy is a chromosomal variation in ————————. (CO2, K2)

(a) Size (b) Position of genes

(c) Number (d) Structure

5. The geometrical device that helps to find out all the possible combinations of male and female gametes is known as (CO3, K1)

(a) Bateson square (b) Mendel square

(c) Punnett square (d) Mendel's cube

6. Which of the following is a classic example of point mutation ————————. (CO3, K2)

(a) Phenylketonuria (b) Sickle cell anemia

(c) Haemophilia (d) Thalassemia

7. The finches of the Galapagos islands provide evidence in favour of ————————. (CO4, K4)

(a) Special creation

(b) Evolution due to mutation

(c) Retrogressive evolution

(d) Biogeographical evolution

8. The last common ancestor of humans is (CO4, K2)

(a) Pan troglodytes (b) Homo neanderthalensis

(c) Lemuroidea (d) Dromaeosaurus

9. What does $p2$ in the below-mentioned Hardy-weinberg equation indicate? $(p+q)^2 = P^2 + 2Pq + q^2$ (CO5, K4)

(a) Individuals that are heterozygous dominant

(b) Individuals having a lethal allele

(c) Individuals that are homozygous dominant

(d) Individuals that are homozygous recessive

10. Genetic drift occurs due to (CO5, K2)

(a) Natural selection

(b) Sudden population migration

(c) Continuous gene migration

(d) Mutation

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

Answer **all** the questions not more than 500 words each.

11. (a) What are multiple alleles? Explain with examples. (CO1, K2)

Or

(b) Write notes on pedigree analysis and give a diagrammatic representation of pedigree chart. (CO1, K2)

12. (a) Explain about molecular markers and their types in gene mapping. (CO2, K4)

Or

(b) What is genetic linkage? Add notes on the linkage map. (CO2, K4)

13. (a) What are the structural abnormalities of chromosomes with example. (CO3, K1)

Or

(b) Discuss about structure and functions of genes. (CO3, K2)

14. (a) Give detailed notes on the theory of natural selection. (CO4, K3)

Or

(b) Explain the concept of Neo-lamarckism. (CO4, K4)

15. (a) Comment on molecular clock. (CO5, K1)

Or

(b) Write short notes on QTL mapping. (CO5, K3)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) What is sex-linked inheritance? Mention different types and give some examples of sex-linked inheritance disorders. (CO1, K1)

Or

(b) Explain three laws of inheritance proposed by Mendel with examples. (CO1, K2)

17. (a) Explain Sex chromosomes and heterochromatinization. (CO2, K3)

Or

(b) Write notes on chromosomal abnormalities in human. (CO2, K5)

18. (a) What is mutation? Discuss the mutant types. (CO3, K4)

Or

(b) Give an account of homologous and non-homologous recombination. (CO3, K1)

19. (a) Discuss about stages in the evolution of man. (CO4, K3)

Or

(b) Explain evidence for the role of natural selection. (CO4, K1)

20. (a) State and explain the law of Hardy-Weinberg principle. (CO5, K3)

Or

(b) Detail notes on genetic drift and founder principle. (CO5, K1)

———————

R0234	Sub. Code
	509302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Zoology

EVOLUTION

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Which of the following is the accepted concept of Lamarck? (CO1, K2)

   (a) Inheritance of acquired characters

   (b) Internal force

   (c) Mutation

   (d) Natural selection

2. The primary hypothesis proposed by Oparin and Haldane on the life origin is (CO1, K1)

   (a) Spontaneous generation

   (b) Panspermia

   (c) Abiogenesis

   (d) Catastrophism

3. The largest division of geological time in the Earth's history is called (CO2, K2)

   (a) Epoch (b) Era

   (c) Period (d) Eon

4. Permian-Triassic extinction last approximately ———————— level of species (CO2, K1)

(a) 50% (b) 75%

(c) 30% (d) 90%

5. The molecular clock used to estimate divergence times between species is (CO3, K3)

(a) Cesium atomic clock

(b) Radioactive carbon clock

(c) Neutral mutation clock

(d) Mitochondrial DNA clock

6. The origin of new genes and proteins can occur through (CO3, K2)

(a) Genetic drift

(b) Mutation and recombination

(c) Epigenetic modifications

(d) Genetic assimilation

7. What does the Hardy-Weinberg Law describe in population genetics? (CO4, K2)

(a) How gene frequencies change over time due to selection

(b) How gene frequencies remain constant in a non-evolving population

(c) How gene frequencies change due to mutations

(d) How gene frequencies change due to migration

8. Two unrelated species independently evolving similar traits due to similar environmental pressures are called as (CO4, K5)

(a) Divergent evolution

(b) Allopatric speciation

(c) Convergent evolution

(d) Co-evolution

9. Kin selection is based on the idea of helping relatives to enhance (CO5, K1)

(a) Inclusive fitness

(b) Group Survival

(c) Individual survival

(d) Group Fitness

10. Social dominance in animal groups is often determined by (CO5, K5)

(a) Size and strength of an individual

(b) Genetic relatedness to the group leader

(c) Amount of parental care received during infancy

(d) Altruistic behaviours towards other group members

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

Answer **all** the questions not more than 500 words each.

11. (a) Explain evidence supports to Lamarckism. (CO1, K5)

Or

(b) Demonstrate unicellular eukaryotes evolution. (CO1, K2)

12. (a) Elaborate events of Mesozoic era. (CO2, K6)

Or

(b) Discuss the cultural evolution of humans. (CO2, K5)

13. (a) Discuss the neutral theory of molecular evolution. (CO3, K6)

Or

(b) Justify gene duplication as an evolutionary event. (CO3, K5)

14. (a) Define gene pool and gene frequency. (CO4, K1)

Or

(b) Distinguish allopatricity and sympatricity. (CO4, K4)

15. (a) Examine the old and modern concept of group selection. (CO5, K4)

Or

(b) Define parental investment and parent-offspring conflict. (CO5, K1)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Discuss Darwin's concepts of evolution with examples. (CO1, K6)

Or

(b) Analyse the Oparin and Haldane concepts on unicellular evolution. (CO1, K4)

17. (a) Explain mass extinction events. (CO2, K5)

Or

(b) Summarize the evolutionary history on the origins of multi-cellular organisms. (CO2, K1)

18. (a) Examine the role of molecular tools in animal phylogeny and evolution. (CO3, K4)

Or

(b) Explain the origin and evolution of new genes. (CO3, K2)

19. (a) Discuss factors that affect Hardy-Weinberg equilibrium. (CO4, K6)

Or

(b) Evaluate the adaptive radiation in mammals. (CO4, K5)

20. (a) Justify Kin selection is a part of natural selection. (CO5, K5)

Or

(b) Elaborate sexual selection and mating systems of animals. (CO5, K6)

———————

R0235	Sub. Code
	509303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Zoology

ECOLOGY AND CONSERVATION BIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Meteorological parameters. (CO1, K2)

   (a) Weather and atmosphere

   (b) Temperature and Humidity

   (c) Wind speed and direction

   (d) All are correct

2. The rocky and outer part of the earth is called (CO1, K2)

   (a) Lithosphere (b) Hydrosphere

   (c) Atmosphere (d) None of the above

3. Natural pathways by which essential elements of living matter are circulated (CO2, K3)

   (a) Chemical cycle

   (b) Physical science

   (c) Biogeochemical cycle

   (d) Environment cycle

4. The natural ecosystem where annual grasses and legumes are most abundant and from where a large fraction of domesticated species originated (CO2, K3)

(a) Grassland ecosystem

(b) Rangeland ecosystem

(c) Wetland ecosystem

(d) Forest ecosystem

5. The role an organism plays in a community is called (CO3, K4)

(a) Ecosystem (b) Habit

(c) Niche (d) Habit and Niche

6. Populations of butterflies and coral-reef fishes are good examples for (CO3, K3)

(a) Population (b) Mega population

(c) Micro population (d) Meta population

7. Air quality monitors are outfitted with ———————— to detect specific pollutants (CO4, K1)

(a) Filter (b) Thermometer

(c) Conductor (d) Sensors

8. Ammonium Nitrate is (CO4, K4)

(a) Fertilizer

(b) Inorganic fertilizer

(c) Man-made synthetic fertilizer

(d) All are correct

9. The combination of all the genes including alleles present in a reproducing population or species (CO5, K4)

(a) Gene pool (b) Concept of gene pool

(c) Population (d) Species

10. A species is likely to become endangered within the near future (CO5, K2)

(a) Endangered (b) Extinct

(c) Threatened (d) Productive population

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Write a short note on the Laws of thermodynamics. (CO1, K2)

Or

(b) Agro-climatic zones of India what is your understanding explain. (CO1, K2)

12. (a) Explain the energy flow models with suitable examples. (CO2, K3)

Or

(b) How you would demonstrate ecological succession – write short notes? (CO2, K3)

13. (a) What criteria would you use to assess the carrying capacity of population growth? (CO3, K5)

Or

(b) How could you verify the community structure – write a short note? (CO3, K5)

14. (a) What explanation do you have for the status of water pollution in India? (CO4, K4)

Or

(b) What are the pros and cons of air pollution control in India? (CO4, K4)

15. (a) Write a short note-understanding of Bio -prospecting. (CO5, K2)

Or

(b) Assess the reasons for animals going to endangered. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) How would you express the biogeographic provinces of the world – explain. (CO1, K2)

Or

(b) What can you infer from Remote Sensing and GIS applications in ecology? (CO1, K2)

17. (a) Predict the present issues in food chains and how you could solve them from your learning – write short notes. (CO2, K3)

Or

(b) Demonstrates the present status of Mangrove in India. (CO2, K3)

18. (a) What criteria would you use to assess the interactions between species and their types? (CO3, K5)

Or

(b) Evaluate the concept of habitat and niche. (CO3, K5)

19. (a) Discuss the pros and cons of Noise pollution in India. (CO4, K4)

Or

(b) What do you think about marine pollution impact and their management in India? (CO4, K4)

20. (a) What criteria would you use to conserve the forest biodiversity? (CO5, K5)

Or

(b) Evaluate the present status of hotspots in India. (CO5, K5)

R0236	Sub. Code
	509304

M.Sc., DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Zoology

FISHERY BIOLOGY AND AQUACULTURE

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the objective questions by choosing the correct option.

1. Fish capture from marine is called (CO1, K2)

   (a) Capture fishery

   (b) Culture fishery

   (c) Polyculture

   (d) Mariculture

2. Some elasmobranchs have modified pelvic fin for copulation called ———— (CO1, K2)

   (a) fins

   (b) Cloaca

   (c) Clasper

   (d) None of the above

3. NIFAP (CO2, K4)

(a) Fisheries Policy

(b) National Fisheries Policies

(c) National Inland Fisheries Policies

(d) National Inland Fisheries and Aquaculture Policies

4. Smoking is used as a technique of (CO2, K4)

(a) Fish Preservation

(b) Mushroom cultivation

(c) Crystallisation of sugar

(d) Fish Harvestings

5. Identify the appropriate answer - Fish cultured in a brackishwater ecosystem is called (CO3, K4)

(a) Aquaculture

(b) Coastal aquaculture

(c) Brackish water aquaculture

(d) Freshwater aquaculture

6. One hectare is equal to (CO3, K4)

(a) 10,000 m^2 (b) 15,000 m^2

(c) 1000 m^2 (d) 5000 m^2

7. The induced breeding in carp ———— is not used (CO4, K2)

(a) Ovaprim

(b) Ovatide

(c) Wova-FH

(d) Ammonia

8. SPF brood stocks (CO4, K2)

(a) Specific Pond Fish Broodstock

(b) Specific disease- free Broodstock

(c) Specific pathogen- free Brood stocks

(d) All of these

9. Fertilization of fish ponds mainly contributes (CO5, K5)

(a) Increase transparency

(b) Wide pH fluctuations

(c) Natural food production

(d) Induced breeding

10. Similarities in Biofloc and Aquaponic techniques (CO5, K5)

(a) Beneficial microorganism

(b) Zero water exchange

(c) Minimum or Zero water exchange

(d) Integrated system

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) What are seine nets? How are they used for fishing? (CO1, K2)

Or

(b) Give an account on patterns of migrations in fishes. (CO1, K2)

12. (a) Examine the issues of introducing the Invasive species. (CO2, K4)

Or

(b) Write on the spoilage of canned fish products and its preventive measures. (CO2, K4)

13. (a) What are the prerequisites for cultivable organisms? (CO3, K4)

Or

(b) Compare extensive, semi-intensive, and intensive cultures. (CO3, K4)

14. (a) Examine the various steps involved in microalgae production. (CO4, K2)

Or

(b) Discuss the types of shrimp hatchery. (CO4, K2)

15. (a) Discuss the various shrimp pathogens and their impact on production. (CO5, K5)

Or

(b) Give an account on pond preparation for eliminating EHP. (CO5, K5)

Part C ($5 \times 8 = 40$)

Answer **all** the questions not more than 1000 words each.

16. (a) Write a note on different types of scales and teeth in fishes. (CO1, K2)

Or

(b) What are the different types of nets and traps? (CO1, K2)

17. (a) Discuss the different steps involved in the IQF processing. (CO2, K4)

Or

(b) Compare the Exsitu and Insitu conservation. (CO2, K4)

18. (a) Explain the various sections in the shrimp hatchery with diagrams. (CO3, K4)

Or

(b) Compare the global aquaculture growth and present status. (CO3, K4)

19. (a) Describe the importance of induced breeding in fin fish. (CO4, K2)

Or

(b) Comment on live feeds and artificial feeds application in shrimp hatchery. (CO4, K2)

20. (a) Discuss the status of biofloc technology application in shrimp culture. (CO5, K5)

Or

(b) Implementation of HACCP in aquaculture farms discuss the advantages. (CO5, K5)

———————

R0237	Sub. Code
	509507

M.Sc., DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Zoology

Elective : ENTOMOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** the following objective questions by choosing the correct option.

1. Which of the following is the smallest order of class Insecta? (CO1, K2)

   (a) Hemiptera (b) Odonatan

   (c) Zeroptera (d) Coleoptera

2. Which body parts of an insect are used for classification into separate orders? (CO1, K2)

   (a) Body segments (b) Antennae

   (c) Jointed legs (d) Mouthparts

3. Insects breathe through ————. (CO2, K1)

   (a) Gills (b) Nostrils

   (c) Spiracles (d) None of these

4. In insects, the largest and most obvious endocrine glands are found in the (CO2, K2)

   (a) Prothorax (b) Mouth

   (c) Head (d) Thorax

5. *Dasineura lini* is the pest of ————————. (CO3, K2)

(a) Rice (b) Mustard

(c) Groundnut (d) Linseed

6. What are the pest-resistant plants? (CO3, K2)

(a) BT-Cotton (b) BT-Brinjal

(c) BT-Tomatoes (d) BT-Cotton and BT-Brinjal

7. The phenomenon of using a predator to control pests is ————————. (CO4, K4)

(a) Artificial control

(b) Biological control

(c) Confusion technique

(d) Genetic engineering

8. Pesticides derived from natural substances are called (CO4, K2)

(a) Organic pesticides

(b) Integrated pesticides

(c) Chemical pesticides

(d) Biopesticides

9. The National Research Center of Integrated Pest Management is situated at ————————. (CO5, K5)

(a) Paschim Banga (b) New Delhi

(c) UP (d) Haryana

10. ———————— is the darling of the beekeeping industry the world over. (CO5, K3)

(a) *Apis florea* (b) *Apis dorsata*

(c) *Apis mellifera* (d) *Apis cerena*

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) List out the general characters of class Insecta. (CO1, K2)

Or

(b) Modern schemes of insect classification and traditional classification compare. (CO1, K3)

12. (a) Explain the distinguishing features of the insect excretory system. (CO2, K4)

Or

(b) Describe the development of the nervous system in insect embryo. (CO2, K2)

13. (a) Write on any three pests of paddy and their prophylaxis. (CO3, K3)

Or

(b) List out the pests of stored products and their controlling measure. (CO3, K2)

14. (a) Discuss the economic importance of pest control. (CO4, K4)

Or

(b) Write notes on chemical pesticides in insect control. (CO4, K3)

15. (a) What are the beneficial insects in India? (CO5, K3)

Or

(b) Give an account of the biology of houseflies. (CO5, K2)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Write an essay on the modern scheme of insect classification. (CO1, K1)

Or

(b) Give a detailed account on collections and preservation of insects. (CO1, K2)

17. (a) Describe the mechanism of digestion in insects. (CO2, K3)

Or

(b) Give an account of circulatory organs in insects. Add a note haemolymph. (CO2, K5)

18. (a) Write an essay on coconut and cotton pests and their prophylaxis. (CO3, K4)

Or

(b) Describe the damages and control measures of agricultural pests. (CO3, K1)

19. (a) Describe about the biological control of insects. (CO4, K3)

Or

(b) Write an essay on integrated pest management and its importance. (CO4, K1)

20. (a) Describe about the role of beneficial insects in agriculture. (CO4, K3)

Or

(b) Write a note on mosquitoes concerning public health. (CO4, K1)

———————