2016

M.Sc.

3rd Semester Examination

ZOOLOGY

PAPER—ZOO-304

Full Marks : 40

Time : 2 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Use separate Answer-scripts for Group-A & Group-B

[Special Paper — Fishery]

Group-A

(Fish Taxonomy and Biology)

1. Answer any *two* of the following : 2×2

(a) Place the following fishes in their appropriate orders (any *four*) :

Esomus denricus, Aplochilus panchax, Labeo fimbriatus, Pleuronectes platissa, Clarias batrachus, Mugil cephalus, cirrhinus cirrosha Anabas testudineus. 2

(b) Cite examples of the fin-fish orders given below (any *four*) : Ophiocephaliformes, Clupeiformes, Rajiformes, Syngnathiformes, Perciformes, Lapidasiremiformes. 2

(c) State distinctive features of any one order : Mugiliformes, Torpediniformes, Siluriformes. 2

(d) Why fish feed contains EAA, EFA, Vitamins & Minerals ? 2

2. Answer any *two* of the following : 4×2

(a) Write the relationship between photoperiod and fish growth. Use illustration. 4

(b) How dissolved oxygen favoured fish growth ? 4

(c) Which biotic factor affects fish growth both in cultured and natural condition ? Discuss in brief. 2+2

(d) What are different plant and animal proteins used in fish feed. Write down the names of EAA (essential amino acids) in fish. 2+2

3. Answer any *one* of the following : 8×1

(a) Find out the percentage weight gain, Feed conversion ratio and protein efficiency ratio when,

Initial weight of the fish — 10g

Final weight of the fish — 20g

Number of experimental fish — 20

Duration of experimental trial — 60 days

Feed given to fish — @ 6% bw of fish

Protein present in feed — 30%

Protein in faecal matter — 45% $2\frac{1}{2}+2\frac{1}{2}+3$

(b) Why fish migrates ? State different types of migration. Discuss the need, advantages and disadvantages of migration. 2+2+2+2

Group-B

(Limnology and Oceanography)

4. Answer any *two* of the following : 2×2

(a) Why wetland is essential in your locality to save the Biodiversity ? 2

(b) Rotifers of different habitats. 2

(c) Enlist major chemical components of sea water. 2

(d) Write a note on : Upwelling. 2

5. Answer any *two* questions from the following : 4×2

(a) What are the physical characters of lotic water bodies ? Write note on : Factors responsible for physical oceanography. 2+2

(b) Why mangrove ecosystem is very essential for restoration of coastal flora and fauna ? 4

(c) Write notes on :

(i) Water budget in Biosphere

(ii) Oceanic temperature / or Kettle Lake. 2+2

(d) How oil spill affect the aquatic lives in sea ? Write notes on : Classification of plankton on the basis of their size. 2+2

6. Answer any *one* questions from the following : 8×1

(a) What is tide ? How tides are originated in ocean ? Write note on : Deep sea mining. 2+4+2

(b) Answer the following questions : 4×2

(i) Aquatic life (Mollusca) in Ocean ;

(ii) Non-point sources of marine pollution ;

(iii) Planktonic adaptation ;

(iv) Continental margin.

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[Special Paper — Ecology]

Group-A

(Biodiversity, Wildlife and Animal Behaviour)

1. Answer any *two* questions of the following : 2×2

(a) Mention the criteria for declaring an area as a biodiversity hotspot.

(b) What is the significance of radio-telemetry.

(c) Add a note on 'Biological Rhythms' with example.

(d) Explain 'SLOSS' concept.

2. Answer any *two* questions of the following : 4×2

(a) Briefly discuss on 'Ex-Situ' mode of biodiversity conservation with an emphasis on species translocation.

(b) Highlight the concept of Joint-Forest management, citing the example of 'Arabari Model'.

(c) Briefly discuss on the IUCN Red list category version of 3 : 1.

3. Answer any *one* question of the following : 8×1

(a) What is endemism ? Enlist major endemic birds in West Bengal. Add a note on the threats and conservation strategies of vulture. 1+4+3

(b) Enlist different turtles and tortoises which are found in India. Briefly explain cost-benefit of social behaviour. 4+4

Group-B

(Aquatic Ecology)

4. Answer any *two* of the following : 2×2

(a) Write down the causes of Coral Bleaching.

(b) Briefly explain 'Drainage basin concept'.

(c) Comment on the high productivity of a mangrove ecosystem.

(d) Highlight the concept of CRZ.

5. Answer any *two* of the following : 4×2

(a) What are the different types of organisms inhabiting a coral ecosystem. State their roles. 1+3

(b) How can estuaries be classified into different categories. Note their ecological significance. 3+1

(c) Briefly discuss different threats on marine wildlife along with highlighting various major conservation measures. 2+2

(d) Explain the relationship between Surface water and Ground water. Add a note on sustainable water management. 2+2

6. Answer any *one* of the following : 8×1

(a) (i) Distinguish between Municipal wastewater and Industrial wastewater. How can recycling and Bioremediation of wastewater be accomplished ? 2+2

(ii) Enlist major Ramsar sites of eastern India. Briefly highlight the values of wetlands. 2+2

(b) (i) Mention the different types of plankton in a lentic ecosystem ? Write down the important characteristics of each taxa (in brief) 1+3

(ii) Schematically represent the vertical zonations of a continental shelf. 4

[Special Paper — Genetics and Molecular Biology]

Group-A

(Genetics)

1. Answer any *two* questions of the following : 2×2

(a) What is testis determining factor ?

(b) Name one important protein expressed after NF-KB activation leading to block apoptosis.

(c) What is the fate of a transgenic XX mice that lack Wnt 4 gene ?

(d) What is branchpoint bridging protein ?

2. Answer any *two* questions of the following : 4×2

(a) How the initiator easpases are activated in animal cell ?

(b) How does guanine nucleotide help in self splicing reaction ?

(c) Why DA × 1 is considered as one of the most puzzling loci in the catalog of sex determing gene in human ?

(d) Illustrate a recognition site of a typical mammalian pre-mrRNA intron by RNAs and proteins.

3. Answer any *one* question of the following : 8×1

(a) (i) State the significant role of BH 3-only protein Bid in the mitochondrial pathway of apoptosis.

(ii) Describe the pathway of apoptosis signaling by TNFRI complex with a diagram. 2+6

(b) (i) How the primary transcript of the double sex (dsx) gene is processed in a sex specific manner ?

(ii) How can sox 9 control the sexx determination in human ? 5+3

Group-B

(Molecular Biology)

4. Answer any *two* of the following : 2×2

(a) State the role of LTBP in TGF-β signalling. 2

(b) State the function of Dnmt 1. 2

(c) State the role of Liposome in gene delivery system. 2

(d) State the function of UVrD protein in DNA repair. 2

5. Answer any *two* of the following : 4×2

(a) State the role of NFKβ signaling in tumor formation.

(b) (i) State the structural homology and differences between TLR and IL-1R.

(ii) Match the following TLR according to its ligand.

1. TLR 1	A. Double stranded RNA
2. TLR 9	B. Flagellin
3. TLR 5	C. Triacyl Lipopeptides
4. TLR 3	D. C_pG Containing DNA

(c) State the role of "Multifunctional protein β-catenin" in Wnt signalling. 4

(d) Explain Positive-Negative selection during non-specific integration and homologous recombination. 4

6. Answer any *one* of the following : 8×1

(a) (i) Illustrate Retroviral gene delivery system with proper diagram.

(ii) How could you inhibit expression of gene at RNA level.

(iii) State function of Pleckstrin homology domain. 3+3+2

(b) (i) State the detail mechanism of Base excision repair with proper diagram.

(ii) State the mechanism of formation of STAT dimer. 4+4

[Special Paper — Parasitology]

Group-A

(Diversity and Biology of Parasite)

1. Answer any *two* questions from the following : 2×2

(a) Distinguish between commensalism and Mutualism with example.

(b) (i) Mention the unique features of blood fluke which make them different from other trematode.

(ii) What is Schistosomule ? 1+1

(c) What is calabar swelling ?

(d) Place the following animals in their proper systematic position (*two* only) :

(i) Entamoeba histolytica,

(ii) Toxoplasma gondii,

(iii) Ascaris lumbricoides,

(iv) Fasciola hepatica.

2. Answer any *two* questions from the following : 4×2

(a) Draw a labelled diagram of an apicomplexan structure. Mention the functional significance of :

(i) Rhoptries

(ii) Subpellicular microtubules

(iii) Micropores. $2\frac{1}{2}+2\frac{1}{2}$

(b) Give idea on the carbohydrate metabolism of a gut parasitic trematode.

(c) Enumerate the structure of cestode tegument with labelled diagram.

(d) State the types of cercariae on the basis of shape and size of their tail.

3. Answer any *one* question from the following : 8×1

(a) Describe in brief about the life cycle of *Diphyllobothrium latum*. Add a note on its pathogenecity and control. 5+2+1

(b) What are the mode of infection and symptoms of Primary Amoebic Meningoencephalitis (PAM). Describe the life cycle stages of the causative organism. 2+1+5

Group-B

(Immuno Parasitology)

4. Answer any *two* of the following : 2×2

(a) What is cancer Immunoediting ?

(b) Write a note on histamine.

(c) Compare acute and chronic inflammation.

(d) Write the principle of Immunofluroscence.

5. Answer any *two* of the following : 4×2

(a) What is hypersensitivity ? Provide a brief account of different hypersensitivity reactions. 1+3

(b) State the mechanism of formation of Membrane attack complex over pathogenic cell. 4

(c) Write the principle of creation of Hybridoma cells with proper diagram. 4

(d) Discuss the factors responsible in autoimmunity. 4

6. Answer any *one* of the following : 8×1

(a) (i) Provide a comparative account of initiation of alternative tickover and properdin pathway.

(ii) What is high affinity IgE receptor ? 6+2

(b) (i) What do you mean by Molecular miniory ?

(ii) State the mechanism of formation of C5 convertase by classical pathway with proper diagram. 2+6

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