Total Pages—18 PG/IIIS/ZOO/303 ,A.2, B.1, B.2, C.1, C.2, D.1 D.2)/22(Day)

M.Sc. 3rd Semester Examination, 2022

ZOOLOGY

PAPER – ZOO-303(Day)

Full Marks : 40

Time : 2 hours

The figures in the right hand margin indicate marks

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

PAPER – ZOO-303A.1

(*Fishery Special*)

(*Fish taxonomy and Biology*)

[*Marks* : 20]

1. Answer any *two* questions : 2×2

   (*a*) Mention the characteristic features of clupeiformes, give an example. 1 + 1

(*b*) Mention the order of following fish : $\frac{1}{2} \times 4$

(*i*) *Scoliodon* sp.

(*ii*) *Hyppocampus* sp.

(*iii*) *Pethia ticto*

(*iv*) *Planiliza persica*

(*c*) Briefly classify the endocrine glands of fish based on functional organization. 2

(*d*) What is Ponderal index ? 2

2. Answer any *two* questions : 4×2

(*a*) Write a short note on Electric organ of eel. 4

(*b*) State the causes of fish migration. Classify fish migration in search of habital selection. $1 + 3$

(*c*) Briefly describe the histological excellence of pituitary gland on the basis of staining. 4

(*d*) What are the different types of "direct care" taken by the fishes for their juveniles ? 4

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

(*a*) "Abiotic factors influence fish growth"– Justify the statement. 8

(*b*) Find out the % of weight gain, FCR and PER and also make a concluding remark on it. 6 + 2

Initial weight of the fish is 4.55 gm
Final weight of the fish is 19.57 gm
Number of experimental fish is 27
Feed given to fish for 28 days
Protein present in the feed is 53.25%
Protein in the fecal matter is 25.75%

PAPER – ZOO-303A.2

(*Oceanography*)

[*Marks* : 20]

4. Answer any *two* questions : 2×2

(*a*) What is continental shelf ? State its importance in the resource generation from the marine ecosystem. 1 + 1

(*b*) What do you mean by upwelling ? 2

(*c*) Briefly state about the evolution of ocean basin. 2

(*d*) What is ocean engineering and mention its roles in formulating marine policy. 1 + 1

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

(*a*) Write a note on the thermal stratification. 4

(*b*) What is plankton ? Based on their size classify them. Give an example of a planktivore fish. 1+2+1

(*c*) How oceanic physical characters are regulated by salinity ? 4

(*d*) What the antibiotics used in aquaculture ? 4

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

(*a*) Briefly discuss the origin following of different types of lakes. 8

(*b*) Briefly describe the zonations of an oceanic ecosystem. 8

PAPER – ZOO-303B.1

(*Ecology Special*)

(*Biodiversity and Conservation Ecology*)

[*Marks* : 20]

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

(*a*) Name a critically endangered mammal and bird each of India.

(*b*) What is the necessity of conserving biodiversity ?

(*c*) How is the IUCN Red list used ?

(*d*) How are vultures associated to human well -being ?

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

(*a*) Enlist different steps needed for holistic conservation of Avifauna. 4

(*b*) State the objectives of wildlife conservation and the problems in wildlife management. 2 + 2

(*c*) Jot down the perspectives of ethical approaches to conservation of wild animals. 4

(*d*) Why are tiger populations declining in India ? 4

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

(*a*) Describe the methods used for census of different groups of animals.

(*b*) Write short notes on any *four* : 4×2

(*i*) Pugmark

(*ii*) Endemism

(*iii*) Conservation status of GIB

(*iv*) Zonations of Biosphere Reserve

(*v*) Total count and sample count

(*vi*) Measurement of species diversity.

PAPER – ZOO-303B.2

(*Aquatic Ecology*)

[*Marks* : 20]

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

(*a*) Distinguish Backwater and Brackishwater.

(*b*) Distinguish Outwelling and Upwelling in the ocean ecosystem.

(*c*) What is 'stream-order' in riverine ecosystem ?

(*d*) What are the major physico-chemical parameters determining the productivity in aquatic ecosystem.

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

(*a*) What are the different physical processes involved in hydrological cycles ?

(*b*) Briefly highlight different categories of estuaries in the global perspectives.

(*c*) Why the continental shelf is considered the most important zone in marine ecosystem as per "Environmental Resource" availability is concerned.—Explain with reasons.

(*d*) Briefly discuss on different CRZs mentioning their characteristic features.

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

(*a*) Briefly discuss on the classificatory scheme of wetlands. What are the criteria for designating a landscape as to be an "Wetland". Enlist different values of wetlands. $3 + 3 + 2$

(*b*) Define Coast. Schematically highlight different zones in the vertical strata of an coast. Why mangrove ecosystem is considered as the most productive ecosystem in the world ? 1 + 3 + 4

PAPER – ZOO-303C.1

(*Genetics & Mol. Biology Special Paper*)

(*Genetics*)

[*Marks* : 20]

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

(*a*) What is the fate of a transgenic *XX* mice that lack wnt4 gene ?

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

(*c*) Why Sxl is considered as master switch in sex determination in Drosophila ?

(*d*) What is the function of cFLIP protein ?

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

(*a*) How a death inducing signalling complex (DISC) is formed ?

(*b*) State briefly the function of Sox9 gene in human sex determination.

(*c*) Describe briefly the function of sex lethal gene in Drosophila.

(*d*) Why DAX1 is considered as one of the most puzzling loci in the catalog of sex determining gene in human ?

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

(*a*) State the mechanism of apoptosome formation with suitable diagram.

(*b*) How the primary transcript of the double sex gene (dsx) and transformer gene (tra) is processed in a sex specific manner in sex determination in Drosophila.

PAPER – ZOO-303C.2

(Molecular Biology)

[*Marks* : 20]

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

(*a*) What are the different types of transposases involve in transposition ?

(*b*) In a misseuse mutation of Tn5 transposases Gha 326 changes to Lys 326. What will be the probable impact on the transposition ?

(*c*) State the role of AC-DS in maize.

(*d*) Write a short note on sleeping beauty gene delivery system.

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

(*a*) Mutation at Tyr 204 and Tyr 221 at the conserved domain of SOCS box lead to disregulation of JAK-STAT signaling. Explain the phenomenon with proper diagram. 4

(*b*) How does mature TGF-dimer form ? What will happen to the cell carrying the TGFR-I mutation during embryogenesis ? 2 + 2

(*c*) A dendritic cell carrying TLR4 Ligand in a MyD88 deficient mice did not show inflammatory response. How ever nuclear translocation of $NF_k\beta$ was observed ? Justify the situation in your own words.

(*d*) Briefly describe the genetic structure of Alu element. Name two genetic disorders caused by Alu element. Comment on the impact of Alu element on evolution of human genome. (2 + 1 + 1)

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

(*a*) (*i*) Briefly describe how does synthesis of long terminal repeat (LTR) element DNA from element RNAs.

(*ii*) Write a short note on RNaseH domain of transposase.

(*iii*) Briefly describe the mechanism of retrohoming. 4 + 2 + 2

(*b*) (*i*) After ligand receptor cross linking Ci75 was displaced from a complex and full length transcription factor recruits the CREB-binding activator protein (CBP) leads to activation of target genes. Elaborate the signalling (upstream) with suitable flow diagram.

(*ii*) State the role of Smad proteins in TGF signalling. 6 + 2

PAPER – ZOO-303D.1

(*Parasitology Special Paper*)

(*Diversity and Biology of Parasite*)

[*Marks* : 20]

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

(*a*) What is apicoplast ?

(*b*) Draw the structure of scolices found in the following order :

(*i*) Diphyllidea

(*ii*) Rhinebothriidea

(*c*) Write the functional significance of

(*i*) Rhoptries

(*ii*) Micropores

(*iii*) Subpellicular microtubules

(*d*) (*i*) What do you mean by infected and infective vector ?

(*ii*) What is rostellum ? 1 + 1

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

(*a*) What is hydatid cyst ? Write the composition of hydatid fluid. 3 + 1

(*b*) What is Calabar swelling and add a note its pathogenecity ? 2 + 2

(*c*) Write the symptoms and treatment of Trichodiniasis.

(*d*) What is primary Amoebic Meningocephalitis (PAM) ?

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

(*a*) Discuss in brief the life cycle, pathogenecity and prophylaxis of *Diphyllobothrium latum*. $5 + 2 + 1$

(*b*) (*i*) State the types of cercariae on the basis of shape and size of their tail.

(*ii*) Explain host-parasitic interaction in the light of host-symbiont contact. $4 + 4$

PAPER – ZOO-303D.2

(*Immunoparasitology*)

[*Marks* : 20]

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

(*a*) Name two anaphylatoxins and state the effect of their receptor cross-linking.

(*b*) State the role of IL8 inflammation.

(*c*) How does histamine supress its own release ?

(*d*) State the immune advantages of subcellular localization of TLRs. Give examples.

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

(*a*) Illustrate the signalling pathways initiated by IgE – Fc∈RI cross linking. What are the cellular of such cross-linking ? $3 + 1$

(*b*) A researcher has few knockout mouse stranis, each of which lacks a specific gene. How might the type-I hypersensitivity response of each knockout strain differ from a wild type mouse. Explain your answer. $2 + 2$

(*i*) Mouse is unable to generate a ∈ heavy chain.

(*ii*) Mouse is unable to express a low affinity Fc∈RII receptor.

(*c*) How does the host ensure that inadvertent activation of the alternative pathway on its own healthy cells does not lead to auto-immune destruction ? How does mannose receptor assist innate immune activation ? 2 + 2

(*d*) Explain the differences between type II and type III hypersensitivity with proper examples. 4

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

(*a*) (*i*) Inflammatory response is one of the critical step of asthma. Explain with proper diagram the early and late stages of asthma.

(*ii*) Write a note on allergen. 6 + 2

(*b*) (*i*) In MyD88-deficient macrophages, TLR4 ligand induced production of inflammatory cytokines is not observed.

However, activation of $NF_K\beta$ is observed with delayed kinetics. Explain NF-Kβ activation with proper illustration.

(*ii*) What is the role of Treg cells in immune tolerance and autoimmunity. 5 + 3
