PG/IIIS/ZOO-303/18

M.Sc. 3rd Semester Examination, 2018

ZOOLOGY

PAPER — ZOO-303

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

Illustrate the answers wherever necessary

(Special Paper : *Ecology*)

GROUP—A

(*Biodiversity, Wildlife and Animal Behaviour*)

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

   (*a*) Depict components of animal behaviour though a model.

   (*b*) State the difference between Census and Sampling.

(*c*) List the vital rate parameters of the Great Indian Bustard.

(*d*) Explain the benefits of JFM.

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

(*a*) Elucidate the difference between Home range and Territory, giving examples ? How are territories advertised ? 3 + 1

(*b*) Compare the characteristics of Innate and Learned behaviours. Cite examples for each ; which of these types do humans rely more on ? 3 + 1

(*c*) Define operational sex ratio. How many EBAs occur in India ? Why is in-situ conservation not always possible ? 2 + 1 + 1

(*d*) Discuss the advantages and disadvantages of Captive breeding. 4

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

(*a*) (*i*) Define Radiotelemetry. State its advantages. Explain the processes of primary devices used to locate wildlife.

(*ii*) How are vultures associated to human well-being ? Note the probable causes of the sudden decline in vulture population. (1 + 1 + 2) + (2 + 2)

(*b*) (*i*) Enlist different IUCN categories with examples each.

(*ii*) What do the terms Hard release and Soft release imply in relation to Species translocation ?

(*iii*) Briefly point out the unique features of Man-Elephant conflict in South West Bengal. 4 + 2 + 2

GROUP–B

(*Aquatic Ecology*)

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

(*a*) Differentiate between backwater and brackish water bodies.

(*b*) Distinguish between Lotic and Lentic water bodies in respect of physico-chemical parameters.

(*c*) Briefly point out the uniqueness of a water molecule.

(*d*) What is coral bleaching ?

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

(*a*) Mention the criteria for justifying a landscape as an 'Wetland'. 4

(*b*) Briefly explain the underlying scientific principles for secondary sewage treatment plants. 4

(*c*) Why mangrove ecosystem is considered as the most productive ecosystem of the world ? 4

(*d*) (*i*) Add a note on Fundamental Niche for hermatypic corals ;

(*ii*) What is Bio film ? $2 + 2$

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

(*a*) Define coast. What are the underlying scientific principles for the Integrated Coastal Zone Management ? Mention different CRZs with their attributes. $2 + 2 + 4$

(*b*) (*i*) Discuss on the different threats to marine biodiversity.

(*ii*) Draw the trophic levels of biodiversity associated with coral reeves.

(*iii*) Give an example each of submerged and rooted emergent macrophyte.

4 + 3 + 1

(Special Paper : *Fishery*)

GROUP–A

(*Fish Taxonomy and Biology*)

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

(*a*) Place the following fishes in their appropriate orders : (any *four*) : $\frac{1}{2} \times 4$

Trigon sp. Cirrhinus reba, Utropich thys vacha, Amblyphasingoolon mola, channa gachua, chanra mondius, chana striatus, Chana Chanra stewartii.

(*b*) State the distinctive features of any one order Beloniformis and syngnathaformis. 2

(*c*) Define fish and fisheries with suitable examples. 2

(*d*) Give an out-line sketch of any two scales : Ctenoid Gnanoid or cycloid. 2

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

(*a*) Write the relationship between photoperiod and Fish growth use Illustration. 2 + 2

(*b*) How desolved oxygen formed fish growth . 4

(*c*) Which biotic fators affects fish growth ? 4

(*d*) What are different plant and animal proteins used in fish feed. 2 + 2

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

(*a*) Why fish migrates ? State different types of migration. Discuss the need, advantages and disadvantages of migration. 2 + 2 + 4

(*b*) Describe the structure and function of Pituitary gland. 4 + 4

GROUP–B

(*Limnology and Oceanography*)

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

(*a*) Why wetland is a important ecological component in your locality ? 2

(*b*) State the different habitats of Rotifers. 2

(*c*) Enlist major physical component of sea-water. 2

(*d*) Write a note on : Heat Floox. 2

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

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

(*b*) How oil spill affect the aquatic lives in sea ? Comments on : Upwelling. 2 + 2

(*c*) Classify the planktons on the basis of their size. State the importance of water Budget in Biosphere. 2 + 2

(*d*) Explain thermal stratification with the help of a suitable example. Note on : Kettle Lake. 3+ 1

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

(*a*) (*i*) Why mangrove ecosystems is very essential for restoration of costal environment ?

(*ii*) How tides are originated in ocean ?

(*iii*) Write a notes on : Deep sea mining. 3 + 3 + 2

(*b*) Answer the following questions (any *four*) : 2 × 4

(*i*) Biological oceanography

(*ii*) Continental shelf

(*iii*) Solution Lake

(*iv*) Cyclomorphosis

(*v*) Sources of marine pollution.

(Special Paper : *Genetics and Molecular Biology*)

GROUP–A

(*Genetics*)

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

   (*a*) What is the enzyme responsible for activating cleavage of executioner caspase and where is it found ?

   (*b*) What is the consensus sequence of intron-exon boundaries ?

   (*c*) What is the function of steroidogenic factor 1 ?

   (*d*) Suppose a mutation occurred in the SRY gene on the human Y chromosome, knocking out its ability to produce the testis-determining factor. Predict the phenotype of an individual who carried this mutation and a normal X chromosome.

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

(*a*) For each of the following sex chromosome complements, what is the phenotypics sex of a person who has :

(*i*) XY with the SRY gene deleted ?

(*ii*) XY with the SRY gene located on an autosomal chromosome ?

(*iii*) XX with a copy of the SRY gene on an autosomal chromosome ?

(*iv*) XXYY with one copy of the SRY gene deleted ?

(*b*) Describe briefly the summary of wnt 4/β-catenin loop specifying mammalian ovary development.

(*c*) Briefly describe the role of tra protein and Double sex protein (DSX^F) in sex determination of Drosophila.

(*d*) Write a brief note on significance of c-Flip protein in death receptor pathway.

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

(*a*) Give the summary of U6 and U2 sn RNP involvement in mRNA splicing. 5 + 3

(*b*) How many subfamilies of Bel-2 proteins are recognized ? Briefly describe the role of two multidomain proteins in the Bel-2 family for permeabilization of the mitochondrial outer membrane. How these two proteins are activated ? 1 + 4 + 3

GROUP–B

(*Molecular Biology*)

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

(*a*) State the structural homology and differences between TLR and IL-1R.

(*b*) Write a short note on SOCS box.

(*c*) State the role of Dnmt in methylation of Mammalian CpG island

(*d*) Express the role of β-catenine in Wnt pathway.

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

(*a*) (*i*) How LTR retrotransposons such as Ty 1 and Ty 3 genetically differs from retrovirus.

(*ii*) With the help of flow diagram describe how do their life cycle differs. $2 + 2$

(*b*) Under an experimental condition, DMBA (7, 12 dimethylbez anthracene) was used to form DMBA-DNA adduct. Describe the repair mechanism initiated under such condition. 4

(*c*) Why inducible expression system is used in transgenesis ? Provide two mechanism of inducible expression of transgenes. $1\frac{1}{2}+2\frac{1}{2}$

(*d*) Describe the strategies of retroviral gene delivary system used in gene therapy. 4

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

(*a*) (*i*) What do you mean by "pseudo kinase domain" ?

(*ii*) State the function of "activation loop" in cytokine receptor.

(*iii*) IL-2 bind with its receptor over an immune cell. State the activation of the receptor and how the signal reaches to nucleus. 2 + 2 + 4

(*b*) (*i*) Describe the mechanism of formation of double stranded DNA from LTR element RNAs.

(*ii*) What is the recognition sequence of Dam methylase. State the role of Dam methylase in DNA repair mechanism. 5 + 1 + 2

(Special Paper : *Parasitology*)

GROUP–A

(*Diversity and Biology of Parasite*)

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

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

   (*i*) *Myxobolus cerebralis*

   (*ii*) *Paragonimus westermani*

   (*iii*) *Trichenella spiralis*

   (*iv*) *Echinococcus granulosus*

   (*b*) What is bothriocephalus anemia ?

   (*c*) (*i*) Mention the name of the larval stages found in the life cycle of *D. latum*.

   (*ii*) What is Oncosphere ?

(*d*) (*i*) What is Calabar sweeling ?

(*ii*) Define phoresis with example.

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

(*a*) Draw a labelled diagram of the structure of aptical complex. Mention the function significance of $2\frac{1}{2} + 1\frac{1}{2}$

(*i*) Rhoptries

(*ii*) Micropores

(*iii*) Subpellicular microtubules.

(*b*) Enumerate the structure of Nematode tegument with labelled diagram. $2 + 2$

(*c*) Write the symptoms and treatment of Trichodiniasis. $2 + 2$

(*d*) Give an account of histopathological changes in host due to parasitic infection. 4

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

(*a*) Describe in brief about the life cycle of *Echinococcus granulosus*. Add a note on its pathogenicity and control. $5 + 2 + 1$

(*b*) (*i*) Describe the structure of myxozoan spores with labelled diagram.

(*ii*) Mention the name and function of different glands found in cercariae of blood fluke. $5 + 3$

GROUP–B

(*Immunoparasitology*)

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

(*a*) Give examples of intracellular pathogens and contact antigens that induce delayed type (type-IV) hypersensitivity. 2

(*b*) Provide a brief account of Toll-like receptor in vertebrate. 2

(*c*) State the role of properdin in formation of C_3 convertase. 2

(*d*) Write the application of Gel electrophoresis. 2

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

(*a*) Give an account of principal mediators involved in type-I hypersensitivity. 4

(*b*) Illustrate the mechanism of Ab dependent formation of C5 convertase. 4

(*c*) Describe the mechanism of MyD88 mediated activation of TLR pathway. 4

(*d*) What is HAT medium ? Mention the biological applications of Monoclonal Antibody (Mab). 2 + 2

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

(*a*) (*i*) Experimentally demonstrate involvement of T-cell in graft rejection.

(*ii*) Write the principle of Immuno fluorescence. 5 + 3

(*b*) (*i*) Discuss with diagram how C5 initiates formation of MAC.

(*ii*) State how complement components promotes Inflammation. 5 + 3