2010

M.Sc.

3rd Semester Examination

ZOOLOGY

PAPER—Z-304

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

[Fishery Special]

Group—A

(Fish Taxonomy and Biology)

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

   (a) Give examples of any *four* fin-fish orders :

   Syngnathiformes, Perciformes, Synbranchiformes, Squaliformes, Coelacanthiformes.

   (b) Place the following fishes in their appropriate orders (any *four*).

   Labeo finsbriatus, Puntius tieto, Ophiocephalus striatus, Raja raja, Tetradow cutcutia.

   (c) State distinctive features of Beloniformes or Augulliformes.

   (d) Add a note on the medicinal importance of Siluroid fishes.

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

(a) Relationship between Temperature and fish growth.

(b) Relationship between Ration size and fish growth.

(c) Accessory respiratory organ in fishes *(Cleroias, Anabus).*

(d) Parental care of nest building fish speces.

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

(a) Calculate the percentage weight gain, specific growth rate (SGR),

Feed conversion ratio (FCR),

Protein efficiency ratio (PER),

and comment on your results,

When—

Initial weight of each fish — 10.0 g

Final weight of each fish — 22.0 g

Number of Fish — 20

Duration of Experimental trial — 56 days

Protein percent in dry feed — 30%

Feed given @ 6% body wf. of fish.

Protein percent in faecal matter — 40%.

(b) What are different endocrine glands present in Teleostean fish ? Indicate their position with suitable sketch and mention the major piscine hormones produced by these glands.

Group—B

(Limnology and Oceanography)

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

(a) Mention different vertical zones in an Oceanic environment. 2

(b) What is solution lake? 2

(c) Define EEZ. Mention the extent of Indian EEZ. 2

(d) Distinguish between : 1+1

Epifauna and Infauna

Or

Oligotrophic and Eutrophic lake

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

(a) What is upwelling? Why upwelling is directly connected with fishery productivity? 2+2

(b) Define tide. How does it forms in an Oceanic system? State the importance of tide in faunal distribution $1+1\frac{1}{2}+1\frac{1}{2}$

(c) Mention differences between lotic and lentic water bodies based on their physicochemical properties. State two important characters of lotic animals. 2+2

(d) Wet lands are often described as kidneys of the landscape—Discuss. 4

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

(a) (i) Distinguish between Kettle lake and Cryogenic lake.

(ii) Discuss the thermal stratification of lake with special reference to temperature. 4+4

(b) Write any *four* of the following : 2×4

(i) Bacterioplankton;

(ii) Heat-Flux;

(iii) Microbial food-web;

(iv) Benthos;

(v) Meroplankton;

(vi) Biogenic Lakes.

Group—A

(Molecular Biology)

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

(a) Mention the common elements of GPCR signalling pathway.

(b) Name two second mesengers which are intracellular signalling molecules.

(c) What do you mean by 'splicing function'?

(d) Mention the role of one factor which is involved in 3'-splice site.

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

(a) How Adenyl-Cyclase is activated by G Protein-Coupled Receptor?

(b) What are the roles of Bax and Bak for the mitochondrial pathway of apoptosis?

(c) Describe the role of Frineric G Protein in GOPR.

(d) Write a short notes on "closing of .cGMP-Gated Cation Channel"

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

(a) (i) Write a brief notes on a model of signalling via TNF receptor (THFR1) with proper diagram.

(ii) Mention the role of holocytochromec in activating easpases. 5+3

(b) (i) Write briefly the functions of U2 sn RNP, U5 sn RNP and U4 sn RNP in spliceosome assembly.

(ii) What is the function of internal guide sequence? $(2\frac{1}{2}+2\frac{1}{2}+2)+1$

Group—B

(Genetics)

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

(a) Mention the essential components of a composite transposon.

(b) Mention two numerator and two denominator proteins in sex determination in Drosophila.

(c) What are the characteristic feature of Transposase.

(d) Mention different types of recombination.

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

(a) Describe briefly the process of replicative transposition with proper diagram.

(b) Add a note on AC/DS family of transposon in corn.

(c) Mention briefly the role of DAX 1 gene in sex determination.

(d) How metozygotes are formed ? Describe the process.

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

(a) Why Double sex is called the switch gene of sex determination in Drosophila.

(b) What are the main feature of the transcription pattern of fruitless gene. 5+3

Or

(a) Give proper illustration of Holliday model.

(d) Design an experiment to distinguish between mutation and recombination involving mutation in r II region of phage T_4. 5+3

[Ecology Special]

Group—A

(Terrestrial Ecology)

1. Differentiate between (any *two*) : 2×2

(a) Mull and Mor type of humus.

(b) Dense forest and very dense forest.

(c) E horizon and B horizon.

(d) Capillary water and gravitational water of soil.

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

(a) Enlist global forest types and their distribution.

(b) Dynamics of litter breakdown.

(c) Role of soil fauna in energy flow.

(d) Turnover time of elements in forest.

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

(a) Classify soil fauna on the basis of habitat, size and duration of stay in soil.

(b) Enlist major soil orders and mention their distinctive features and distribution.

Group—B

(Human Ecology)

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

(a) What is replacement fertility ?

(b) What are the major Environmental impacts of Thermal inversion ?

(c) Mention two indoor pollutants and their source.

(d) What do you understand by ecotourism ?

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

(a) Enlist the major impacts of urbanisation on biodiversity.

(b) Destinguish between restoration and reclamation with the help of a graph.

(c) Mention the constraints for ensuring Ecorestoration.

(d) What is doubling time of population ? Calculate doubling time of a population growing a rate of 1.4% per year.

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

(a) Define waste. Give a classificatory overview of solid wastes. Write in brief about different methods of solid waste management. 1+3+4

(b) Give a brief account of the demographic trends of human population growth in developed and developing countries. What is TFR ? 5+3