2013

M.Sc.

3rd Semester Examination

ZOOLOGY

PAPER—ZOO-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.

[Molecular Biology and Genetics Special]

Group—A

(Molecular Biology)

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

(a) Write the consensus sequence of intron-exon boundaries.

(b) What happens when a transgenic XX mice lack Wnt 4 gene ?

(c) Name two inhibitors of apoptosis proteins (IAPS).

(d) What is the role of granzyme B ?

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

(a) In mammalian ovary pathway, what is the role of Wnt 4 and R-spondin 1 ?

(b) Why doublesex gene is called the switch gene for sex determination in Drosophila ?

(c) Write briefly the simplified mechanism of nuclear mRNA precursor splicing.

(d) State the role of holocytochrome C in activating caspases.

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

(a) (i) Write briefly the role of Caspase-8 in death receptor pathway. 5+3

(ii) Write a short note on Bax and Bak.

(b) Illustrate the yeast spliceosome cycle with proper diagram.

Group—B

(Genetics)

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

(a) State the role of 14-3-3 protein in RTK signalling.

(b) Write a short note on Non-Composite transposon.

(c) What is 'P element' of *Drosophila* sp. ?

(d) What are the cellular consequences of TGF-β signalling ?

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

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

(b) (i) Describe the structural differences between phospholipase Cβ, Phospholipase cδ and Phospholipase cγ.

(ii) State the role of Pleckstrin homology domain. 3+1

(c) How signal transduction progresses through gp130 signalling complex if "tocilizumab" an interlenkin-6 receptor inhibitor that bind to IL-6R is withdrawn ? 4

(d) Explain "Sleeping Beauty transposon system" with proper diagram. State its application in clinical domain. 3+1

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

(a) (i) Illustrate Base excision repair mechanism with suitable diagram.

(ii) State the role of PARP [Poly(ADP-ribose)Polymerase] in DNA repair. 5+3

(b) (i) State the mechanism of formation of dimeric TGF-β molecule.

(ii) Illustrate TGF-β signalling highlighting the role of Smd proteins. 2+6

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[Fishery Special]

Group—A

(Fish Taxonomy and Biology)

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

(a) State distinctive features of any *one* fin fish order with suitable examples :

(i) Clupeiformes ;

(ii) Perciformes.

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

(i) *Labeo rohita* ;

(ii) *Pleuronectes platessa* ;

(iii) *Mugil cephalus* ;

(iv) *Raja raja* ;

(v) *Puntius ticto* ;

(vi) *Classias batrachus.*

(c) Mention different sources of non-conventional feed resources used in fish feed formulation.

(d) Write a short note on the nutritional role of fish and human health.

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

(a) Dissolved oxygen and fish growth — Explain the relationship with suitable illustration.

(b) Relationship between temperatures and fish growth — justify with suitable illustration.

(c) State the biotic factors which influence fish growth.

(d) Fish pituitary hormones — Mention types and functions in brief.

3. (a) Formulate a feed containing 30% crude protein (CP) for Indian major carps grower from fish meal (54% CP). Mustard oil cake (48% CP) and Rice bran (13% CP). Calculate the requirement of fish meal, mustard oil cake and Rice bran to prepare 100 kg feed by using "Square method of Handy, 1975".

(b) Calculate the percentage Weigh Gain, Protein Efficiency Ratio (PER), Feed Conversion Ratio (FCR) and comment on your results, when —

Initial weight of fish — 10.0 g

Final weight of fish — 20.0 g

Number of fish — 15

Duration of experimental trial — 90 days

Protein percent in dry freed — 30%

Feed given @ — 6% body weight

Protein percent in faecalmeatter — 42%.

Group—B

(Limnology and Oceanography)

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

(a) What are the different vertical zones in an Oceanic environment? 2

(b) Why Cyclomorphisis is important for Planktonic animals? 2

(c) Write note on : 1+1

(i) Oceanic Fauna.

(ii) Kettle Lake.

(d) Distinguish between : 2

Epifauna and Infauna.

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

(a) Wet lands are described as Kidney of the nature — justify this idea with proper interpretation. 4

(b) What are the physical characters of lentic water bodies ? State two distinct characters of lotic animals. 3+1

(c) What is upwelling? Why upwelling is directly connected with fish production? $1\frac{1}{2}+2\frac{1}{2}$

(d) Briefly describe the chemical nature of the Oceanic water. Write note on : Heat Flux. 3+1

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

(a) Discuss Thermal stratification of a lake. Describe horizontal zonation of Continental shelf. 4+4

(b) Write notes on (any four) : 2+2+2+2

(i) Benthos.

(ii) Thermal stratification of Lake.

(iii) Exclusive Economic Zone (EEZ).

(iv) Meroplankton.

(v) Pond water habitat.

(vi) Mangrove lives.

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[Ecology Special]

Group—A

(Terrestrial Ecology and Mathematical Ecology)

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

   (a) In which states of India 'Fresh Water Littoral Forest is found ?

   (b) What is turn over time of nutrients ?

   (c) Classify forests on the basis of crown cover.

   (d) What is pedogenesis ?

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

   (a) Write in brief on the dynamics of litter breakdown.

   (b) Differentiate between 'E' horizon and 'B' horizon of soil.

   (c) Explain the concept of JFM.

   (d) State the difference between Index of similarity and index of association.

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

   (a) (i) Distinguish between the I-state and E-state of ecological modelling.

   (ii) Explain the physicochemical characteristics of soil belonging to four different types of forests. 4+4

   (b) Discuss the role of soil fauna in nutrient cycle. Illustrate faunal distribution in respect of vertical stratification of plants in the forest. 4+4

Group—B

(Human Ecology)

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

(a) What is 'Doubling Time' of population ?

(b) Enlist different past environmental changes.

(c) Mention the composition of municipal wastes.

(d) State the rationale of Ecorestoration.

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

(a) Describe four landscape states as defined by degree of habitat destruction.

(b) Briefly discuss the merits and demerits of ecotourism.

(c) State the causes and consequences of soil errosion.

(d) Briefly highlight 'Zero Population Growth' and 'Replacement Fertility'.

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

(a) Draw the relationship between Green House Effect and Global Warming. Briefly discuss the impact of global warming on coastal biodiversity and on the reproduction of reptiles. 2+3+3

(b) Mention the significance of 'Thermal Inversion' in respect of Air-Pollution. Explain the impact of Acid-Rain on agriculture and aquaculture. Add a note on Indoor Pollution. 2+3+3

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