# 2011

## 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.*

## *[Fishery Special]*

### Group—A

### *(Fish Taxonomy and Biology)*

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

(i) Illustrate briefly the growth curve of fish.

(ii) Accessory respiratory organ in fish.

(iii) Biotic and abiotic factors influencing fish growth.

(iv) Give examples of following fish orders : Lamniformes, Ophiocephaliformes, Squaliformes, Mugiliformes.

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

(i) Temperature and fish growth with suitable sketch.

(ii) Dissolved oxygen and fish growth with supporting sketch.

(iii) Parental care in fish.

(iv) Natural good and supplementary food.

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

(i) Calculate percentage weight gain, food conversion ratio (FCR) and protein efficiency ratio (PER) and comment on your result when —

Number of fish — 15

Initial wt. of fish — 12 g (each)

Final wt. of fish — 30g (each)

Duration of trial — 60 days.

Feed given to the fish — @ 6% $bio^{-1}$

Protein percent in feed — 35%

(ii) You are advised to prepare a 35% protein grower food for Indian major carps with carcass waste (68% protein) and maize germ meal (22% protein) to

make 100 kg of feed by using the square method of Hardy (1975).

## Group—B

### *(Limnology and Oceanography)*

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

(a) What is Neep Tide ? 2

(b) Enlist the major constituents of sea water. 2

(c) Highlight the functional contribution of wet lands. 2

(d) Write note on : Deep sea temperature profile. 2

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

(a) What is Plankton ? Classify plankton on the basis of their size. 1+3

(b) What is Periphytoa. State the adaptive significance of the said organisms. 1+2

(c) Prepare a check list of benthic organisms in a fresh water ecosystems. 4

(d) Write notes on (any *two*) of the following : 2×2

(i) True Oceanic animals.

(ii) Meroplankton.

(iii) The continental margin.

(iv) Animals in lotic system and their morphological changes.

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

(a) What is lake? Discuss the geomorphology of lake basins as per the prevailing climatological condition. 2+6

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

(i) Phases of Hydrological cycle.

(ii) Vertical distribution of zooplankton.

(iii) Classification of lakes based on Circulation patterns.

(iv) Thermal stratification.

(v) The role of entrophication in pond.

(vi) Benthic faunal distribution.

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## [ Genetics & Molecular Biology Special ]

### Group—A

### (Molecular Biology)

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

(a) What do you mean by GT–AG rule ?

(b) Name two mitochondrial intermembrane space proteins those antagonize the caspase-inhibitory activity of IAP (inhibitors of apoptosis protein).

(c) Mention one protein molecule which prevent mitochondrial outer membrane permeabilization (MOMP) and one protein molecule which promote MOMP.

(d) Mention the role of $SH_2$ domain in signal transduction.

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

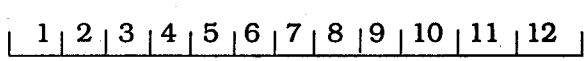
(a) How can you explain that the chemical reactions in nuclear splicing proceed by transesterification ?

(b) Mention the role of U6 sn RNA in spliceosome assembly.

(c) Write a brief note on Shelterin complex along with protein component.

(d) Describe the role of CDI, CDII and CDIII in *Saecharomyces cerevissae.*

(e) Assuming the diagram below is the diagrammatic representation of a region of rII locus of the phage T4; The mutation x, y & z




behaves in the way, as shown in the result below :

1. mutant x does not recombine with deletions when crossed with nos. 1, 2, 3, 4, 5, 6, 7, & 8.
2. mutant y does not recombine with the deletion 9, 10, 11, 12.
3. mutant z does not recombine with either of the deletions.

Map the location of mutations x, y & z in the above diagram & comment on their characteristics.

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

Briefly narrate the formation of a death-inducing signalling complex (DISC) with proper diagram.

Or

Describe the epidermal growth factor receptor tyrosine kinase signalling pathway through Mitogen activated protein kinase. What do you mean by transphosphory lation in Receptor tyrosine kinase activation. 6+2

## Group—B

## *(Genetics)*

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

(a) What will be the fate of sex determination in mice if the fgtg gene is knocked out?

(b) Which pathway of mammalian gonad development is controlled by Wnt 4 and R-spondin 1. gene?

(c) Name diseases associated with LINE and SINE.

(d) How can you ealenlate the centromeric index (i)?

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

(a) Why Sox I gene is considered as the central male determing gene in mammal?

(b) How does Doublesex protein ($Dsx^F$) regulate all known aspect of sexually dimorphic gonad cell fate?

(c) Elaborate the P mediated hybrid dysgenesis in Drosophila.

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

(a) What is Holliday structure? How the Holliday structure can be converted to the recombinant structure? Demonstrate in schematic form. What is the role of rec A and rec B gene in general recombination.

(b) Describe the events of sex-specific RNA splicing in two major Drosophila sex determining genes such as doublesex and fruitless. 5+3

*Or*

Design an experiment by which you can introduce wild type rosy$^+$ (ry$^+$) into a strain homozygous for a mutant rosy allele. What is autonomous transposable element? Give example. 6+2

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## *[Ecology Special]*

### Group—A

### *(Terrestrial Ecology and Mathematical Ecology)*

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

(a) What is pedogenesis?

(b) What is turnover finge of nutrients?

(c) What do you mean by Index of similarity and Index of association?

(d) Differentiate between hemiedaphic and enudaphic fauna.

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

(a) Ecological importance of soil fauna.

(b) Write a note on Joint Forest Management.

(c) Enlist eight types of forest which may be found in West Bengal. Cite one floral example of each.

(d) State the significance of 'Fresh water littoral forest'. Give two floral examples.

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

(a) Give a brief account of the main types of spatial microdistribution pattern. On the basis of survey involving 30 samples mean and variance of a species were found to be 60 and 75 respectively. Comment on the microdistribution pattern of the species.

(b) Discuss in brief role of soil fauna in leaf litter decomposition.

## Group—B

## *(Human Ecology)*

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

(a) Distinguish between reclamation and rehabilitation.

(b) Enlist merits and demerits of ecotourism.

(c) Distinguish between total fertility rate and replacement rate.

(d) Mention the causes and consequences of soil pollution.

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

(a) Briefly describe the major problems of urbanization.

(b) Highlight the causes, effects and future of Human Population Growth.

(c) Highlight the principle of ecological restoration with an example.

(d) Highlight the composition of municipal waste and their controlling strategies.

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

(a) Highlight the relationships among global warming, climate change and green house effect. Briefly discuss the effect of temperature elevation on reproduction and dispersal of animals 3+5

(b) Discuss the common sources of indoor pollution. Enlist the effects of indoor over pollution. Add a note on 'Thermal Inversion'. 4+2+2

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