PG/IVS/Z-402/10

M.Sc. 4th Semester Examination, 2010

ZOOLOGY

PAPER—Z-402

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

(Ecology Special Paper)

GROUP—A

(*Terrestrial Ecology and Mathematical Ecology*)

1. Answer *two* of the following : 2 x 2

(*a*) What is oxisol ? Where it is found ?

(*b*) Mention role of mycorrhiza in circulation of nutrients in forest ecosystem.

(*c*) Differentiate between hemiedaphic and enedaphic fauna.

(*d*) What is pedogenesis ?

2. Answer *two* of the following : 4 x 2

(*a*) Write a note on Joint Forest Management.

(*b*) Give a brief idea about the vertical stratification of animals in forest.

(*c*) State the advantages of mathematical models in solving ecological problems.

(*d*) Enlist eight types of forest found in West Bengal. Cite one floral example of each.

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

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

(*b*) Show that modern agricultural practices can adversely affect the density and diversity of soil fauna.

GROUP–B

(*Wildlife and Molecular Ecology*)

4. Answer *two* of the following : 2 x 2

(*a*) What is Threat Authority File Version 2·1 ?

(*b*) Estimated number of a species is less than 250 individuals and probability of extinction is 50% within next 10 years. Identify the red list status of this species with justification.

(*c*) What are allozymes ?

(*d*) Name four subspecies of Asian elephant and mention their distribution.

5. Answer *two* of the following : 4 x 2

(*a*) State in brief the management techniques for critically endangered avifauna. 4

(*b*) Explain in what way DNA fingerprinting can help in wildlife conservation. 4

(*c*) What do you understand by a threatened species ? Name six critically endangered vertebrates which are likely to be found in West Bengal. 1 + 3

(*d*) Mention three main patterns of spatial micro distribution. Explain coefficient of dispersion. $1\frac{1}{2} + 2\frac{1}{2}$

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

(*a*) What are the main assumptions on which mark-release and recapture method of the estimation of population is based on. State Lincoln-Petersen model of the single

mark-single recapture method. Estimate the population size and confidence limit at the 95% level of a species on the basis of following data : $2+2+4$

Marked and released individuals – 45
Recaptured marked individuals – 20
Recaptured unmarked individuals – 20

(*b*) Name the living subspecies of *Panthera tigris* and mention its distribution. Give a brief account of the feeding behaviour and population status of *Panthera tigris*. Add a note on project tiger. $2\frac{1}{2}+4+1\frac{1}{2}$

(Fishery Special Paper)

GROUP–A

(*Fish Taxonomy and Biology*)

1. Write *two* of the following : 2×2

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

(*i*) *Labeo bata*

(*ii*) Lates calcarifer

(*iii*) *Myrtus vittatus*

(*iv*) *Mugil tade*

(*v*) *Amblypharyngodon mola*

(*vi*) *Scoleodon sorakowa.*

(*b*) State distinctive features of any *one* order with suitable examples :

(*i*) Cypriniformes

(*ii*) Anguilliforms.

(*c*) Write short note on the economic importance of siluroid fishes.

(*d*) Mention different sources of plant and animal proteins used in fish feed formulation.

2. Write *two* of the following : 4 x 2

(*a*) Relationship between photoperiod and fish growth with suitable illustrations.

(*b*) Dissolved oxygen in water and fish growth. Explain the relationship with illustration.

(*c*) Migration in fish Biotic factors influencing fish growth.

(*d*) Provide a brief note on efficiency of immune system of fishes in comparision to highest vertebrates.

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

(*a*) (*i*) Calculate to compare the cost of supplying a particular ingredients using the 'least cost' technology when – Groundnut oil cake contains 42% protein and costs INR 20·00 kg^{-1} and fish meal contains 54% protein and costs INR 40 kg^{-1}.

(*ii*) Formulate a 25% protein. IMC brooder feed from fish meal (54% protein) and wheat bran (12% protein). Calculate the requirement of fish meal and wheat bran to prepare 1000 kg feed by using the 'Square method of Hardy'.

(*b*) Calculate the percentage weight gain, Protein Efficiency Ratio (PER), Feed Conversion Ration (FCR) and comment on your result, when

Initial weight of fish – 5·0 g
Final weight of fish – 15·0 g
Number of fish – 20
Duration of experimental trial – 60 days
Protein percent in dry feed – 35%
Feed given @ 6% bwd^{-1}.
Protein percent in faecal matter – 41%.

GROUP–B

(*Aquaculture and Fish Technology*)

4. Answer *two* of the following : 2 x 2

(*a*) Role of selective breeding.

(*b*) Brood fish care– Importance.

(*c*) Induced spawning and its significance.

(*d*) Causes of fish spoilage *or* Role of extension education in community development with special reference to fisheries.

5. Answer *two* of the following : 4 x 2

(*a*) Write down the differences between cage and pen culture.

(*b*) Fishing crafts operated in the East Coast of India.

(*c*) Bag nets and Boat seines.

(*d*) Canning of fish and human health.

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

(*a*) Define integrated fish farming. What are different types of integrated culture systems operated in India. Describe the 'duck-fish' integrated farming.

(*b*) Write down the principle and different methods of fish freezing.

(Molecular Biology & Genetics Special Paper)

GROUP–A

(*Molecular Biology*)

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

   (*a*) What do you mean by 'snurps'? What is its composition ?

   (*b*) Distinguish between self splicing and transplicing.

   (*c*) What is meant by a ligand ? What is its role ?

   (*d*) What do you understand by genomic imprinting and epigenetic transmission ?

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

   (*a*) Briefly describe the lariat mechanism of splicing with appropriate diagram. 4

   (*b*) Narrate briefly the process of apoptosome formation its role in apoptosis. 4

(*c*) Write a short note on *branch-point sequence* and *caspases*. 2 + 2

(*d*) In what way DNA methylation can affect gene expression ? 4

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

(*a*) (*i*) Write briefly the extrinsic death receptor pathway of apoptosis, with suitable diagram.

(*ii*) How the death receptor induced apoptosis is blocked ? 5 + 3

(*b*) Name the different amino acid residues of histones which are subjected to covalent modifications and mention their respective kind of modification(s). Briefly describe the process of histone modifications. 3 + 5

GROUP–B

(*Genetics*)

4. Answer *two* of the following : 2 x 2

(*a*) What is a "cis-trans" test ? With proper illustrations describe the process ?

(*b*) Distinguish between monomeric and dimeric enzyme.

(*c*) Mention the role of cyclic GMP in signal transduction.

(*d*) What are the roles of MAPK-P ?

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

(*a*) How hormone action is mediated via calcium ions ?

(*b*) Describe the differential activation of *Sxl* gene in female and male Drosophila.

(*c*) Mention the role of *DAV-1* gene and *SF1* gene in human sex determination.

(*d*) Describe with experimental evidence that crossing over occur at 4-strand stage.

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

(*a*) What are the differences between single-strand and double-strand break model of recombination. Give proper illustrations. 8

(*b*) Describe the mechanism of hormone action, mediated through '*ras*' pathway. How protein kinase A is activated ? 5 + 3