2009

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

Write the answers questions of each Group in separate books

[Fishery Special]

GROUP—A

(*Fish Taxonomy and Biology*)

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

(*a*) What is Gonadosomatic index ?

(*b*) Name crustacean diseases of Carp.

(*c*) State the economic importance of Siluriformes.

(*d*) Nutritive value of fish.

2. Write any *two* from the following : 4 x 2

(*a*) Abiotic and Biotic factors influencing fish growth.

(*b*) Significance of cage culture in fishery.

(*c*) Immuno Defence system in fish.

(*d*) Parental care in fish.

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

(*a*) Calculate the FCR and PER and comment on your results, when

Initial wt. of fish—10 g
Final wt. of fish—25 g
Number of fish— 20
Duration of Experiment— 60 days
Feed given — @ 6% bwd^{-1}
Protein in feed — 30%.

(*b*) State the function of the pituitary hormones in fish.

GROUP—B

(*Aquaculture and Fish Technology*)

4. Answer *two* of the following : 2x2

(*a*) Role of Nursery pond in aquaculture.

(*b*) Importance of Fish meal.

(*c*) Define post harvest activity.

(*d*) Extraction of Cod-liver oil.

5. Answer *two* of the following : 4x2

(*a*) Protocol for cryopreservation.

(*b*) Purse-seine and mode of its operation.

(*c*) Integrated fish farming.

(*d*) Role of fisheries extension in rural development.

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

(*a*) Briefly describe freezing, drying, canning and pickling technology adopted in India.

(*b*) Write notes on any *two* of the following :

(*i*) Importance of hypophysation

(*ii*) Fish marketing.

[Ecology Special Paper]

GROUP — A

(*Terrestrial Ecology and Mathematical Ecology*)

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

(*a*) In which states of West Bengal 'Fresh water littoral forest' is found? Give two floral examples.

(*b*) What is turnover time of nutrients ?

(*c*) What is half time for decomposition ?

(*d*) What is ecological modeling ? State two applications of it.

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

(*a*) Differentiate between deterministic and stochastic models.

(*b*) Differentiate between 'Mull' and 'Mor' type of humus.

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

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

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

(*a*) Classify soil fauna on the basis of habitat, size and life cycle.

(*b*) Discuss role of soil fauna in energy flow and nutrient cycle.

GROUP—B

(*Wildlife and Molecular Biology*)

4. Answer any *two* questions from the following : 2x2

(*a*) What is critically endangered species ? Give one example.

(*b*) Give two morphological differences between Asian Elephant and African Elephant.

(*c*) Name two Bird census technique.

(*d*) Expand : CITES, IUCN, WWF, MAB.

5. Answer any *two* questions from the following : 4x2

(*a*) Explain I.U.C.N. Red List Category Version 3·1.

(*b*) Calculate pattern of distribution (sample size is 10) where variance of a species is 25 and mean number is 10.

(*c*) Add a note on Man and Elephant conflict in Bengal.

(*d*) Mention the possible potential risks to the survival of the vulture.

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

(*a*) Discuss the theory of island biogeography in relation to rate of immigration, extinction, size of island and proximity or otherwise of the island to the mainland. 8

(*b*) Mention scientific principle of PCR. Briefly discuss method of PCR mentioning different components required for it. Explain the role of DNA fingerprinting in wildlife conservation. 2 + 4 + 2

[Genetics & Molecular Biology Special Paper]

GROUP—A

(*Molecular Biology*)

1. Answer any *two* : 2 x 2

(*a*) Identify the *snRNP* that recognizes the following sites :

5^1 *splice site* and 3^1 *splice site.*

(*b*) What is a *transesterification* reaction ?

(*c*) Name two inhibitors of the *apoptosis protein* .

(*d*) What do you mean by *VNTR* and where is it found ?

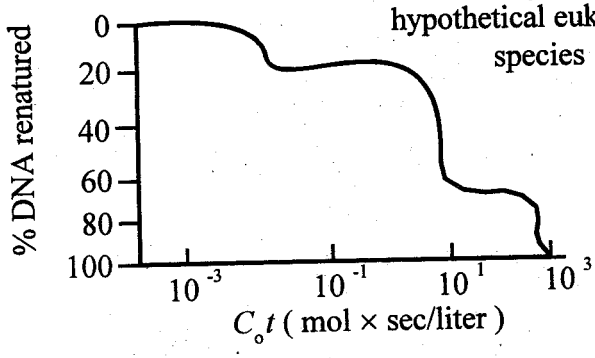
2. Answer *two* of the following : 4×2

(*a*) A lariat contains a closed loop and a linear end. An intron has the following sequence :

5^1- GUPu AGUA - 60 nucleotides— UACUU AUCC— 100 nucleotides— Py_{12}NPyAG - 3^1.

Which sequence would be found within the closed loop of the lariat, the 60 - nucleotide sequence or the 100 - nucleotide sequence ?

(*b*) Here is a C_0t curve for a hypothetical eukaryotic species



Estimate the amount of highly repetitive DNA, moderately repetitive DNA and unique DNA.

(*c*) Give a schematic representation of *spliceosome* cycle.

(*d*) How *apoptosome* is formed?

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

(*a*) (*i*) Describe the *death receptor pathway* with proper diagram.

(*ii*) How *Caspases* are activated? 6 + 2

(*b*) (*i*) How a *Lariat* is formed in nuclear splicing?

(*ii*) Mention the important sequences of *group I intron*. 6 + 2

GROUP—B

(*Genetics*)

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

(*a*) Illustrate the function of *Steroidogenic* factor 1.

(*b*) Name one potential ovary determining gene on autosome and mention its function.

(*c*) How would you determine that the position of two mutants of the *white* locus are different ? Show the experimental design.

(*d*) What do you understand by generalised transduction ? Give proper examples.

5. Answer any *two* questions : 4 x 2

(*a*) Briefly describe the sex specific RNA splicing in the *double-sex gene* and *transformer* gene in *Drosophila melanogastor.*

(*b*) Describe the holiday model with appropriate diagrams.

(*c*) Briefly describe the differential activation of the *sex lethal* gene in *Drosophila* .

(*d*) What is λ *d gal* ? How a hybrid attachment site of the *plasmid* λ can be formed ? Explain with proper diagram.

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

(*a*) Give an account of the experiments of Zinder and Laderberg (1952). Which led to the finding of the process of transduction in bacteria. Keep proper diagram and justify your statements.

(*b*) Draw a functional subdivision of the alleles of the *white* locus in *Drosophila melanogastor*. Show the characteristics properties of the right and left half of the locus showing its relationship with the allele *zoste* and with the phenomenon of disease compensator.
