PG/IVS/ZOO-403/13

M.Sc. 4th Semester Examination, 2013

ZOOLOGY

PAPER – ZOO-403

Full Marks : 40

Time : 2 hours

Answer **all** questions

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 to questions of each Group in separate books

[Fishery Special]

GROUP – A

(*Aquaculture and Fish Technology*)

1. Answer *two* questions : 2×2

(*a*) Define post harvest technology.

(*b*) Induced breeding.

(*c*) Distinguish between nursery and stocking pond.

(*d*) Brood fish care and its management.

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

(*a*) Describe in brief on the sea fishing crafts and gears.

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

(*c*) Fish oil extraction and its use.

(*d*) Cryopreservation of gamats :

Write down the steps and mention its significance.

3. Answer any *one* question : 8×1

(*a*) Describe in brief on the

– Types of freezing of fish. $2\frac{1}{2}$

– Fish drying process and its significance $2\frac{1}{2}$

– Canning technology. 3

(*b*) Define integrated fish farming and its significance. Discuss different types of integration with example. 8

GROUP – B

(*Inland and Marine Fisheries*)

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

(*a*) Enlist the residential Fish species of Hooghly-Matlah estuary.

(*b*) Why conservation is essential for reservoir fishery ?

(*c*) State the major divisions of an estuary on the basis of salinity.

(*d*) Give the names of marine products export from India.

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

(*a*) What is remote sensing systems and how it works in the field ? $1 + 3$

(*b*) Write down the adverse effects of raw sewage on aquatic life. Note on : Sewage water treatment for fish culture. 1 + 3

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

(*i*) Biology of Crustacea

(*ii*) Deep sea Fishes

(*iii*) Public health fishery.

(*d*) Enlist major achievements in present day aquacultures systems. 4

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

(*a*) (*i*) How we recycling the sewage water in agriculture sector ?

(*ii*) Visual interpretation through Remote sensing system

(*iii*) Achievements in marine fishery.

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

(*i*) Eutrophication in reservoir

(*ii*) Estuarine Fin-fishes

(*iii*) Facultative stabilization pond

(*iv*) Fish migration

(*v*) Factors responsible for reservoir development in India.

(*vi*) Fishery extention programmes.

[Ecology Special]

GROUP – A

(*Wildlife and Molecular Ecology*)

1. Answer *two* questions from the following : 2 × 2

(*a*) What are the criteria for endemism ?

(*b*) What is 'SLOSS' debate ?

(*c*) Define molecular marker with example.

(*d*) Enlist different Birds Census Techniques.

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

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

(*b*) Schematically represent the IUCN category based on Version 3·1.

(*c*) Discuss the role of DNA fingerprinting in wildlife conservation.

(*d*) Briefly discuss different 'In-Situ' and 'Ex-Situ' methods of Biodiversity conservation.

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

(*a*) State two morphological differences between Asian and African elephant. Write in brief about feeding and breeding behaviour of Asian elephant. Add a note on human elephant conflict in West Bengal. 2 + 3 + 3

(*b*) Make the classification of Islands from Biogeographical viewpoint. Briefly discuss the problems and strategies of adaptation and colonization of Island fauna. 8

GROUP – B

(*Aquatic Ecology*)

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

(*a*) Differentiate Backwater from Brachish water.

(*b*) Differentiate Continental shelf from Continental slope.

(*c*) Differentiate Upwelling from Outwelling.

(*d*) Differentiate lotic aquatic system from lentic one.

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

(*a*) Classify lakes based on mixing patterns.

(*b*) Explain the significance of Thermal stratification.

(*c*) Briefly highlight the role of 'Marine Parks'.

(*d*) Elaborate the hypothesis of 'Top-Down' and 'Bottom-Up' with examples in Aquatic Ecosystem.

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

(*a*) Define Wetland. Give a classificatory scheme of wetlands. Write the values of wetland. Enlist 4 major Ramsar Sites in India.

(*b*) Define Coast. Highlight underlying principle of Integrated Coastal Zone Management (I.C.Z.M). Briefly discuss about different C.R.Zs in Indian Perspective.

[Molecular Biology and Genetics Special Paper]

GROUP – A

(*Recombinant DNA and Molecular analysis*)

1. Answer *two* from the following : 2×2

   (*a*) Compare the nucleotide-pair sequences of genomic DNA clones and *c* DNA clones of specific genes of higher plants and animals.

   (*b*) How does Restriction Endonuclease-II differ from Restriction Endonuclease III ?

   (*c*) What common experimental procedure is carried out in Southern, Northern and Western blot analysis ?

   (*d*) What is chemiluminescence ?

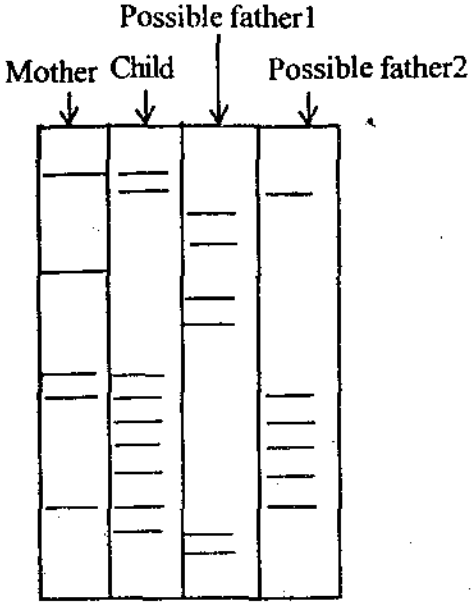
2. Answer *two* from the following : 4×2

   (*a*) What is *T-A* cloning ? How is it related to directional cloning of the target gene ? $2\frac{1}{2} + 1\frac{1}{2}$

   (*b*) State the principles and applications of Southern blotting. $3 + 1$

(*c*) State the advantages of PCR-marker analysis over RFLP analysis. How can you distinguish a dominant and a recessive RAPD marker in gel electrophoresis ? $2\frac{1}{2}+1\frac{1}{2}$

(*d*)



(*i*) Observe DNA fingerprint of a mother, her child and two men each of whom claimed to be the child's father. Predict the possible father with arrow mark and give explanation.

(*ii*) Give the structure of a typical cosmid cloning vector. $1\frac{1}{2} + 2\frac{1}{2}$

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

(*a*) (*i*) Describe the properties of expression vector with suitable example.

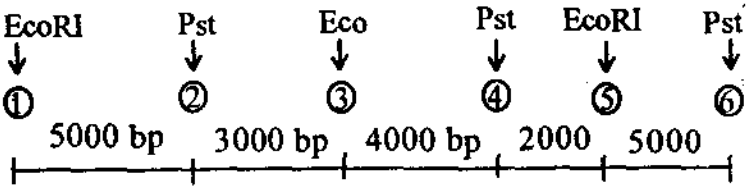
(*ii*) A Linear DNA molecule is subjected to single and double digestion with restriction endonucleases and following results are obtained :

Enzymes	Fragment Size(kb)
Eco RI	2·9, 4·5, 7·4, 8·0
Hind III	3·9, 6·0, 12·9
Eco RI+Hind III	1·0, 2·0, 2·9, 3·5, 6·0, 7·4

Draw the restriction map by these data. $5 + 3$

(*b*) The drawing below shows a restriction map of a DNA segment. Potential restriction sites are numbered. The thick line

represents the part of the molecule that has homology with a probe 2×4



(*i*) Assume that individual 1 has restriction sites 1 through 6. If DNA is digested with Pst 1, what are the expected sizes of DNA fragments that will hybridize with prove

(*ii*) Assume that individual 2 has a mutation that eliminates site 4. If DNA is digested with Pst I, what are the expected sizes of DNA that will hybridize with probe ?

(*iii*) If DNA of individual 1 is digested with both Pst I and Eco RI, what are the expected sizes of DNA fragments that will hybridize with the probe ?

(*iv*) Assume that individual 3 has a mutation that eliminates site 5. If the DNA is digested with Pst 1, what are the expected sizes of DNA that will hybridize with the probe ?

GROUP – B

(Applied Genetics)

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

(*a*) How can you establish that each person differs genetically from every other ?

(*b*) Enlist the steps through which great diversity of Immunoglobulins are generated.

(*c*) What is an HTF island ?

(*d*) Mention the biological applications of Monoclonal Antibody (MAb).

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

(*a*) Give a new strategy for genome sequencing proposed by craig venter. 4

(*b*) Define Autoimmunity with example. Add a note on any one autoimmune disease you have studied. 1 + 3

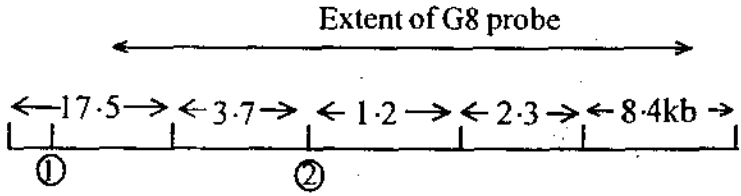
(*c*) State the role of ncRNAs encoded by the X-chromosome in human. 4

(*d*) Why myeloma cells are used in hybridoma technique ? What do you mean by allelic exclusion ? 1 + 3

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

(*a*) Write the principle of Immunofluorescence. Describe briefly about direct and indirect Immunofluorescence. Mention its applications. 2 + 5 + 1

(*b*) (*i*) The following is a map of a region you are mapping by RFLP analysis



The vertical lines represent restriction sites of Hind III. Only 1 and 2 may or may not be present. You cut the DNA with Hind III, electrophorese the fragments, blot them to a membrane of probe with a DNA whose extent is shown at top. Give the sizes of bands you will detect in individuals for the following haplotypes. Explain it.

Haplotype	Polymorphic Hind III sites	
	①	②
A	–	+
B	–	–
C	+	+
D	+	–

(*ii*) How do SNPS differ from RFLPS ?

$5\frac{1}{2} + 2\frac{1}{2}$