M.Sc.

2017

4th Semester Examination

ZOOLOGY

PAPER—ZOO-403

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.

Answer *all* questions of the following.

(SPECIAL : FISHERY)

Group-A

(*Aquaculture and Fish Technology*)

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

(a) Define post harvest activity and state its significance.

(b) Mention different methods of fish meal production and its uses.

(c) State the significance of preparation of nursery and rearing pond.

(d) State whether the transgenic fish in aquaculture is ecofriendly or not. If not—Explain.

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

(a) What is selective breeding ? State the significance of selective breeding.

(b) How you will define integrated fish forming ? Mention different types of Agro-Animal-Fish integration and its uses in West Bengal.

(c) How fisheries/aquaculture helps in livelihood generation is rural India ?

(d) What are different types of fishing crafts operated in Indian court ?

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

(a) Discuss in brief on the role and protocol for cry observation of fish gametes with view diagram.

(b) Briefly describe the protocol of induced breading of Indian major carps.

Group — B

(*Inland and Marine Fisheries*)

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

(a) Why 'Raw sewage' is detrimental for fish culture system ?

(b) Why public health fisheries is useful for the society ?

(c) Explain the role of Active sensor in Rs-system.

(d) Write note on : Biology of Prawn.

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

(a) Enlist the marine resource in India. Note on : Demarshal Fishery. 2+2

(b) Menthion the different stapes in relation to prepare a new reservoir. 4

(c) State a brief account of sewage water treatment process in reference to fish culture practice. 4

(d) Answer the following questions : 2+2

(i) Molluscan fisher in India.

(ii) CMFRI and their actions.

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

(a) How remote sensing system function in aquaculture ? Write a note on : Recent development in Fishery Sciences. 5+3

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

(i) Fishes in sewage water body.

(ii) Economically important marine products.

(iii) Fishery extension system.

(iv) CRZ

(v) Backwater fishery in Kerala.

(vi) Fish Santuary.

(SPECIAL : Genetics & Molecular Biology)

Group — A

(Recombinant DNA and Molecular Analysis)

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

(a) Explain the basic principle of Blue-white screening.

(b) Compare Taq and Pfu polymerase. Which one is useful for sequencing reaction ?

(c) State the importance of Tm value in PCR.

(d) What are the advantages of use of dUTP over dTTP in PCR reactions ?

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

(a) (i) Explain the mechanism of FRET.

(ii) Arrange the following Fluorescence molecules according to FRET Pair : $2\frac{1}{2}+1\frac{1}{2}$

Donnor (Emission)		Acceptor (excitation)	
A) FITC	520 nm	i) m Plum	590 nm
B) EBFP2	488 nm	ii) TRITC	550 nm
C) Taq REP	584 nm	iii) MEGEP	489 nm

(b) State the basic principle of FISH. What is colony PCR ? State its applications. 2+1+1

(c) Illustrate the properties of prokaryotic expression vector with proper example. 4

(d) What is chemiluminescence ? What are the different types of chemiluminescence ? Explain any one them. 1+1+2

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

(a) (i) Describe the basic principle and procedure of dideoxy sequencing.

(ii) Explain the principle of *pyrosequencing.* 2+3+3

(b) (i) State the properties of fluorescence probes used in Real time PCR with examples.

(ii) Why IPTG is used in TA cloning ?

(iii) How would you construct-double round Nested Primers ? 5+1+2

Group — B

(*Applied Genetics*)

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

(a) What is CpG suppression ?

(b) What kind of mutation give rise to Huntington disease ?

(c) What is an open reading frame (ORE) ? Write a DNA sequence containing a short ORF.

(d) Mention the role of SNP in construction of human genome map.

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

(a) What major conclusions can we draw from the sequence of human chromosome 21.

(b) On what plasmid are the BAC vectors based ? What essential elements do they contain ?

(c) State the characteristic features of Ig heavy chain gene with diagram.

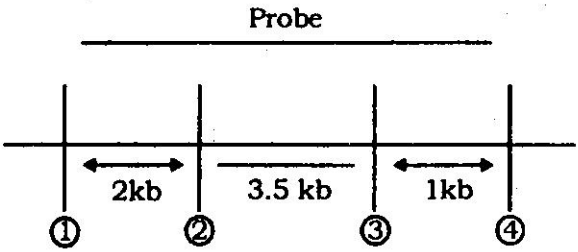
(d) Write a brief note on any autoimmune disease you have studied.

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

(a) (i) Compare and contrast the clone-by-clone sequencing strategy and the shotgun sequencing strategy for large genome.

(ii) How does an express sequence tag (EST) differ from an ordinary STS. 5+3

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



The numbered vertical lines represent restriction sites recognized by Sma I. The circled sites (2,3) are polymorphic, others are not. You cut the DNA with Sma I, electrophorese the fragments, plot them to a membrane and probe with a DNA whose extent is shown at top, Give the sizes of bands you will detect in individuals homozygous for the following haplo types with respect to sites 2 and 3.

Haplotype	Site 2	Site 3
A	Present	Present
B	Present	Absent
C	Absent	Present
D	Absent	Absent

(SPECIAL : ECOLOGY)

Group — A

(*System & Molecular Ecology*)

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

(a) State the necessity for developing Ecotourism.

(b) What does 'Turnover' refer to in case of terrestrial and lacustrine ecosystem ?

(c) Suppose a developer proposes to clear-cut a fruit garden (orchard) in order to construct a residential complex. To compensate, the developer also promises to pay an appropriate price to the landowner. What would you call such a process in context of Restoration Ecology ? Also state how shall you convince both the parties for retaining the pre-existing ecosystem ?

(d) Name the categories under Tropical forests of India. What is the basis of such classification ?

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

(a) Define Patch, Corridor and Matrix. State the significance of corridor in ecological functioning. 3+1

(b) Why do some populations cycle ? Demonstrate Synchrony with the help of an example and graph. 1+3

(c) Describe the basic kinds of dispersion patterns exhibited by individuals within a population. Which of these three types of dispersion is most common and which one is the rarest in nature and why? 3+1

(d) Illustrate the types of Water Movement in Lakes and indicate the time scales of mixing processes in different layers and zones. 3+1

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

(a) Answer any *four* of the following short questions : 4×2

(i) Stochastic *vs.* Deterministic model.

(ii) Plantation *vs.* Deforestation.

(iii) Role of molecular markers in wildlife conservation.

(iv) Relation between vertical Stratification of Plants and Animals in forest.

(v) Ecorestoration as an 'Acid-test'.

(vi) Role of Microbes in Nutrient cycling.

(vii) Factors influencing Metacommunity dynamics.

(b) From the figure given below, find out :

(i) The species richness for each habitat.

(ii) The α, γ and β diversity of each habitat for all four regions.

(iii) Which of the habitats display high species evenness ?

(iv) Comment on the results obtained from each region and make a comparative statement.

1+4+1+2

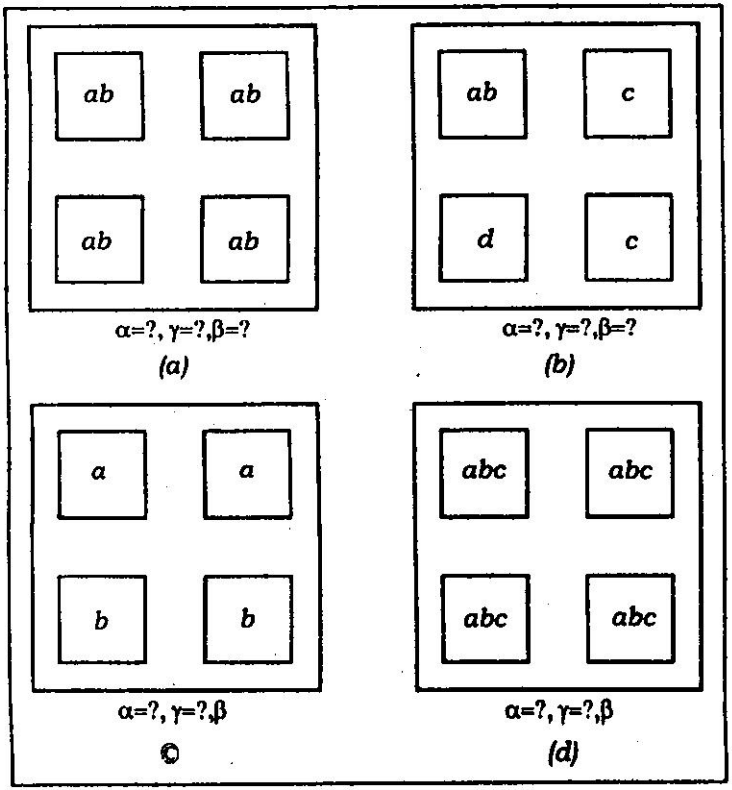


Fig : 1. relationship between alpha, gamma and beta diversity Each large box (region) has four small boxes (habitats).

Group — B

(*Human Ecology*)

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

(a) Enlist major global environmental issues.

(b) Mention different types of Sustainable Development.

(c) Highlight different methods of carbon sequestration.

(d) Explain the criteria for discounting a place as to be an "Urbanised Area".

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

(a) Briefly discuss on the different steps in "Watershed Management".

(b) Enlist and discuss on major 'Indoor Pollutants'.

(c) Highlight the merits and demerits of unbanisation on biodiversity.

(d) Briefly discuss on different Environmental Acts in India pertaining to Wildlife Air and Water.

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

(a) Explain the underlying scientific principle of Integrated waste Management. Briefly discuss on different methods of nondegradable solid waste management add a note on composting. 2+4+2

(d) Define EIA. Enlist different steps in EIA. Highlights the criteria for developing a 'green belt' as industrial environment management measure. 1+3+4

(SPECIAL : PARASITOLOGY)

Group — A

(*Vector biology and Vector borne parasites*)

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

(a) What do you mean by Cyclopropagative and Cyclodevelopmental transmission ? Give example.

(b) Write the medical importance of black flies.

(c) What is Maggot Debridement Therapy (MDT) ?

(d) What do you mean by relapses and recrudescence in malaria ?

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

(a) What is Myiasis ? Distinguish between specific and semi specific myiasis. 2+2

(b) Discuss in brief the humoral response in African trypanosomiasis.

(c) What is 'Q' fever ? Mention its diagnosis and treatment procedure. 1+3

(d) Distinguish between Ixodidae and Argasidae families of tick. 3+1

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

(a) Describe briefly any one lice borne disease you have studied. Mention its symptom and treatment. Add a note on lice control. 2+2+2+2

(b) State the morphological features of flea. Comment on the adverse effects of flea bites. What is lyme disease ? 4+3+1

Group — B

(*Molecular Parasitology and Epidemiology*)

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

(a) Why immuno-fluoxo histochemistry is preferred over immuno-enzymatic histochemistry for the diagnosis of parasitic infection ?

(b) What do you mean by land scape epidemiology ? Give example.

(c) What do you mean by Tm value ?

(d) What is complement fixation test (CFT) ? Write the strategies adopted for diagnosis of parasitic infection by CFT. $\frac{1}{2}+1\frac{1}{2}$

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

(a) State the principle of s-ELISA why s-ELISA is preferred over c-ELISA for diagnosis of parasitic diseases ?

(b) "Diagnosis of Parasitic infection at early step can easily be performed by ABC technique than simple immuno enzymatic histochemical technique" — Justify the statement by mentioning the principle of ABC technique.

(c) State in brief the unique characteristics of gene expression in Trypanosoma. 2+2

(d) Explain the role of helminth as therapeutic agent. Give example.

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

(a) Distinguish between macro-epidemiology and micro-epidemiology. Write aims of epidemiology. Discuss in brief the epidemiology of malaria.

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

(d) Write the steps adopted for the presentation of data collected from ELISA test through B/Bo% unit citing an example. Write advantages over traditional graphs in this concern. Write in brief the fluorescence probe used in Real Time PCR. 4+2+2

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