

M.Sc.

2014

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) Comment on brood fish care and its significance.

(Turn Over)

- (b) Write note on induced spawning and its importance in Aquaculture.
- (c) Give idea on organic aquafarming.
- (d) Distinguish between Nursery and stocking pond / Rearing pond.

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

- (a) What do you mean by post harvest technology ? Write different types of post harvesting methods.
- (b) Write down in brief on the cryopreservation of gamets. State its significance.
- (c) Discuss in brief on the fish-anineal integration system/culture. State the advantages of integration.
- (d) Write in brief the fish by-products and its use.

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

- (a) Distinguish between craft and gears. Discuss in detail on the common crafts and gears used in the East Coast of India.
- (b) Describe briefly on the different freezing methods used in the fishery industry.

Or

Different steps of canning for the important food fishes of India.

(Group-B)

(Inland and Marine Fisheries)

4. Answer any *two* questions of the following : 2×2
- (a) Write the importance of fishery Co-operatives in fish culture sector.
 - (b) Write note on: Public health fishery.
 - (c) Mention the different larval stages of 'brackish water shellfish'.
 - (d) Write note on EEZ.
5. Answer any *two* questions of the following : 4×2
- (a) Define reservoir. State the different phases of reservoir development.
 - (b) 'Mangroove ecosystem develop a unique relationship with flora and fauna' – justify.
 - (c) Define eutrophication. How it causes problems to reservoir fishery in India.

(d) Write notes on: 2+2

- i) Importance of fishery extension.
- ii) Law of diminishing return.

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

(a) Describe the different mode of use of sewage water for traditional fish culture system. $4\frac{1}{2}+2+1\frac{1}{2}$

(b) Prepare a checklist of sewage specimens that are cultured in aquaculture system.

(c) Write note on: CRZ (Coastal Regulatory Zone).

- (d) i) Discuss the problems of marine fisheries in India.
 ii) State different conservation strategies of marine fish species. 4+4

(SPECIAL : ECOLOGY)

(Group-A)

(Wild life and Molecular Ecology)

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

- (a) Explain Wildlife crime.

- (b) Enlist four different critically endangered mammals of West Bengal.
- (c) With a flow chart, highlight different conservation categories according to IUCN Red List Category Version 3.1.
- (d) Briefly highlight the applicability of GIS.
2. Answer any *two* questions of the following : 4×2
- (a) State the properties of DNA-based molecular markers? How Allozymes are used in assessing genetic diversity? 2+2
- (b) Explain the role of DNA barcoding in biodiversity studies. Add a note on impact of GMO on environment. 2+2
- (c) Discuss the role of 'Radio Telemetry' in Wild Life conservation. 4
- (d) Explain the equilibrium model of the island biogeography.
3. Answer any *one* question of the following : 8×1
- (a) Discuss different criteria for the survey of birds by Transect Method. What is Species Area Curve? Add a note on the conservation strategy of Wood peckers. 4+2+2

- (b) Explain Endemism. Briefly explain the endemic status of avifauna in India. Justify the statement – “Wetland and Forest as complementary habitats for the conservation of avifauna”.

(Group-B)

(Aquatic Ecology)

4. Answer any *two* questions of the following : 2×2
- (a) State the reasons of high biodiversity in coral ecosystems.
 - (b) Define estuary and enlist different types of estuary based on hydrological cycle.
 - (c) State the importance of coastal zone.
 - (d) Briefly explain the role of zooplankton in aquatic ecosystem.
5. Answer any *two* questions of the following : 4×2
- (a) Mention the major threats to Global Marine diversity and the measures needed for their protection.
 - (b) Why continental shelf is considered as the most productive zone in marine ecosystem ?

- (c) Highlight the difference between Municipal & Industrial sewage. Also state the principles of tertiary sewage treatment process. 2+2
- (d) Explain the continuous concept of nutrient spiralling.

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

- (a) (i) Comprehensively classify lakes on the basis of their origin.
- (ii) Illustrate Thermal stratification in a lake (with a graph). Briefly discuss on the major zonations in a lake ecosystem. 4+4
- (b) (i) Describe the structure & functions of Mangrove ecosystem of Sundarbans, West Bengal, India.
- (ii) Enlist the factors contributing to water quality degradation. 5+3

(SPECIAL : GENETICS & MOLECULAR BIOLOGY)

(Group-A)

(Recombinant DNA and Molecular Analysis)

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

- (a) What is Time Resolved Fluorometry ?

- (b) State the importance of His-tag in plasmid expression vector.
- (c) State the importance of T_m value in PCR.
- (d) What are the functional differences in Tag, vent and Pfu Polymerase ?

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

- (a) State the characteristics of three type of Restriction-Modification system.
- (b) How does ethidium bromide interact with DNA and how does it help in visualising DNA on an agarose gel ?
- (c) Arrange the following Fluorescence molecules according to FRET pair :

Donnor (Emission)	Acceptor (Excitation)
A) FITC 520 nm	i) m Plum 590 nm
B) EBFP2 488 nm	i) TRITC 550 nm
C) Tag RFP 584 nm	i) m EGFP 489 nm

Explain the mechanism of FRET. $1\frac{1}{2}+2\frac{1}{2}$

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

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

- (a) (i) State the principle of Pyrosequencing.
(ii) State the mode of action of Ampicillin, Tetracycline and Kanamycine.
(iii) What is Red-White selection? 4+3+1
- (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? 3+1+3+1

(Group-B)

(Applied Genetics)

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

- (a) What is somatic hypermutation?
(b) Mention the role of Activation-Induced cytidine Deaminase (AID) in generating antibody diversity.
(c) What are the primary goal of HGP?
(d) What do you mean by CPG island?

5. Answer any *two* questions of the following : 4×2
- (a) Define class switching with proper diagram.
 - (b) Write in brief the Monoclonal antibody (MAB) production protocol with suitable diagram.
 - (c) Write the major features of human genome on the basis of distribution of genes, number of introns, number of protein coding gene and gene density.
 - (d) State the features of eukaryotic genome which are not found in prokaryotes.
6. Answer any *one* question of the following : 8×1
- (a) Define Autoimmunity. Discuss briefly the factors involved in autoimmunity. Add a note on Myasthenia gravis. 1+4+3
 - (b) (i) Briefly describe the evolutionary history of the globin gene super family.
 - (ii) What are unexpected features of prokaryotic genome ? 5+3
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