

**2022**

**M.Sc.**

**4th Semester Examination**

**ZOOLOGY**

**PAPER—ZOO-403**

*Full Marks : 40*

*Time : 2 Hours*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

**SPECIAL PAPER : FISHERY**

**ZOO-403A.1 AQUACULTURE & FISH  
TECHNOLOGY**

1. Answer any *two* questions : 2×2

(a) State the importance of induced breeding.

(b) Write short note on cryoprotectant.

(c) Write short note on Environmental Protection Act.

*(Turn Over)*

(d) Give an example of following economically important of following organisms :

- (i) Marine fishes ;
- (ii) Fresh water fishes ;
- (iii) Crustacea ;
- (iv) Molluscs. 4 ×  $\frac{1}{2}$

2. Answer any *two* questions : 2 × 4

(a) What are the key problems found in Indian aquaculture ?

(b) Write notes on : (i) Freezing and (ii) Drying. 2+2

(c) Briefly describe the Bundh Breeding.

(d) Mention different types of integrated fish farr technologies.

3. Answer any *one* question : 1 × 5

(a) Mention one Bacterial, Protozoan and Helminth disease in fishes and also mention their symptoms and control measures. 4 × 2

(b) Mention different types of fishing gears and crafts of India. 4+4

**ZOO-403A.2 INLAND & MARINE FISHERY**

4. Answer any *two* questions : 2×2
- (a) Write a brief note on Biofloc Technology.
  - (b) Write a note on : Solution Lake.
  - (c) State the different habitats of Rotifers.
  - (d) Write a short note on River-ranching program.
5. Answer any *two* questions : 2×4
- (a) Describe different management practices required for enhancement of reservoir fisheries in India.
  - (b) Most of the natural lakes were formed by catastrophic Events — Explain. Write short note on "Chilka Lake". 2+2
  - (c) Writes short notes on :
    - (i) Cage culture ;
    - (ii) Mariculture. 2+2
  - (d) Discuss the fishery *potential* of Hooghly-Matla Estuary.

6. Answer any *one* question : 1×8
- (a) Define Sewage and Sludge. Give a brief account of Sewage treatment process prior to its application in fish culture pond. 1+1+6
- (b) What is Remote-Sensing (RS) technique? State the functional shapes in RS-System in aquaculture practice. Explain the roles of RS-GIS in fishery science. 2+3+3
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## SPECIAL PAPER : ECOLOGY

### ZOO-403B.1      SYSTEMS ECOLOGY

1. Answer any *two* questions : 2×2
- (a) Differentiate between Conservation biology and Ecological restoration.
- (b) Describe four landscape states based on the level of habitat destruction.
- (c) Who originated the metacommunity concept? What are the factors influencing interaction among communities in this regard?
- (d) Why are Tropical forests considered as one of the most productive ecosystems?

2. Answer any *two* questions : 2×4
- (a) What do the terms patch, corridor and sink signify ?
- (b) Graphically depict the relationship of Ecorestoration with other related activities.
- (c) Illustrate the vertical structure of communities from aquatic to terrestrial ecosystem.
- (d) State the basic principles of Ecotourism. Name few successful ecotourism ventures in India.

3. Answer any *one* question : 1×8

- (a) (i) Calculate the Jaccard's coefficient from following :

	Species abundances					
Site $x_1$	7	3	0	5	0	1
Site $x_2$	2	4	7	6	0	3

- (ii) Exemplify the lakes formed through gradual natural processes. 4+4

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

- (i) MEA ;
- (ii) Regulating vs. Supporting Ecosystem services ;
- (iii) Ecological trajectory ;
- (iv) Open vs. closed canopy ;
- (v) Thermocline ;
- (vi) Afforestation. 4×2

**ZOO-403B.2 HUMAN ECOLOGY**

4. Write short notes on any *two* of the following : 2×2
- (a) Biological pollutants ;
  - (b) Impact of indoor pollutants on human health ;
  - (c) Mention the significance of Ecomark ;
  - (d) Non-degradable pollutants.
5. Answer any *two* questions : 2×4
- (a) Enlist different global environmental issues mentioning their ranks in respect of intensity of their impacts.
  - (b) Briefly highlight the process and significance of watershed management. 2+2
  - (c) Mention the composition of urban solid waste.
  - (d) Highlight the significance of vermicomposting in organic solid waste recycling.

6. Answer any *one* question : 1×8
- (a) Define E.I.A. What are its major steps? Explain the criteria for the selection of plants for the development of 'Green Belt'. 2+3+3
- (b) Define urbanization. What are the criteria for designating an area as to be an urban area? Mention the merits and demerits of urbanization on biodiversity. 2+2+4
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**SPECIAL PAPER :**  
**GENETICS AND MOLECULAR BIOLOGY**

**ZOO-403C.1**  
**GENETIC DISEASES AND MOLECULAR ANALYSIS**

1. Answer any *two* questions : 2×2
- (a) What do you mean by  $\alpha$ -complementation?
- (b) What is the use 'Histidine (His<sub>6</sub>) Tags' in the expression vector?
- (c) State the difference between 'vent' and 'pfu' polymerase.
- (d) Write a short note on RAPD.

2. Answer any *two* questions : 2×4
- (a) What is T-A cloning? What is vector to insert ratio? 2+2
- (b) Write a detailed procedure of DNA-finger printing.
- (c) Describe the modification of dideoxy sequencing.
- (d) How Taqman Probe is advantageous over Syber-Green probe in real time PCR?
3. Answer any *one* question : 1×8
- (a) Describe the mechanism of formation of extracellular senile plaques and neurofibrillary tangles connected to the Alzheimer's disease. Explain with suitable diagrams.
- (b) Describe pyrosequencing method and state its advantages over dideoxy-sequencing. What do you mean by Shotgun sequencing. 4+2+2

### ZOO-403C.2 APPLIED GENETICS

4. Answer any *two* questions : 2×2
- (a) Mention lymphoid specific enzymes participating in the recombination process.

- (b) What kind of mutation gives rise to Huntington Disease?
- (c) What is class switch recombination?
- (d) Differentiate Secreted  $\mu$  and Membrane  $\mu$  of TCR.

5. Answer any *two* questions : 2×4

- (a) How coding joints and signal joints are created in V(D)J recombination?
- (b) Describe a recombination-based system of recognition molecules that does not depend upon RSSS.
- (c) How are Gusela and colleagues able to locate HD (Huntington Disease) to chromosome 4?
- (d) Show cis-regulatory elements that control immunoglobulin gene transcription of IgH, IgK and Igl.

6. Answer any *one* question : 1×8

- (a) Describe the process of kappa-light-chain receptor editing.
- (b) Describe the process of detecting RFLP associated with human disease.

**SPECIAL PAPER : PARASITOLOGY****ZOO-403D.1****VECTOR BIOLOGY AND VECTOR BORNE PARASITES**

1. Answer any *two* questions : 2×2

(a) What do you mean by cyclopropagative and cyclodevelopmental transmission? Give example.

(b) What is Hypostome? Write the scientific names of American cattla tick and Black legged tick.

(c) What do you mean by Primary Kinetes and Cytomeres?

(d) Write the medical importance of black flies.

2. Answer any *two* questions : 2×4

(a) Write the mode of transmission and symptoms of Brucellosis.

(b) Distinguish between Ixodidae and Argasidae families of tick with example.

(c) Distinguish between Amastigote and Promastigote stage of *Leishmania* sp. with suitable diagram. What is PKDL? 3+1

(d) What is Myiasis? Mention the major classifications of Myiasis. 1+3

3. Answer any *one* question : 1×8

- (a) Describe the lifecycle, clinical features and treatment of *Babesia* sp. "The vector of Babesiosis is one host." — How can they transmit pathogens from one host to another?

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(b) Write short notes (any *two*) :

- (i) Classical and occult filariasis ;
- (ii) Trench fever ;
- (iii) Jumping mechanism of flea ;
- (iv) Maggot Debridement Therapy (MDT). 4+4

**ZOO-403D.2**  
**MOLECULAR DIAGNOSIS AND**  
**CLINICAL PARASITOLOGY**

4. Answer any *two* questions : 2×2

- (a) What are the enzymes (any two) used for labelling purpose of antigen or antibody in ELISA.
- (b) Define cross reaction in ELISA.
- (c) Write about the clinical features of hook worm anaemia.

(d) Comment on the diagnosis method of Dracunculiasis.

5. Answer any *two* questions : 2×4

- (a) How do you prepare the standard curve in RIA ?
- (b) State the roles of monoclonal antibody in ELISA.
- (c) Write the clinical features of Toxoplasmosis.
- (d) Comment on the mode of infection of *Enterobius vermicularis*.

6. Answer any *one* question : 1×8

- (a) Write the working principle of scintillation counter used for RIA with diagram. 6+2
  - (b) Describe the lifecycle, pathogenecity and prophylaxi of *Hymenolepis nana*. 5+2+1
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