



‘समानो मन्त्रः समितिः समानी’

**UNIVERSITY OF NORTH BENGAL**

B.Sc. Honours 6th Semester Examination, 2023

**DSE-P4-ZOOLOGY**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.*

**The question paper contains three groups: GROUP-A, GROUP-B and GROUP-C  
The candidates are required to answer any *one* from *three* groups.  
Candidates should mention it clearly on the Answer Book.**

**GROUP-A**

**ANIMAL BIOTECHNOLOGY**

1. Answer any **five** of the following: 1×5 = 5
  - (a) Is Shine-Dalgarno in 5-UTR?
  - (b) What is Pfu DNA polymerase?
  - (c) Which enzyme is designated as chemical knives of DNA?
  - (d) Define infinite cell line.
  - (e) State Chargaff’s rule.
  - (f) Why Restriction enzyme don’t cut their own DNA of bacteria?
  - (g) Name two chemicals which are used in cryopreservation.
  - (h) What is the DNA primer called?
  
2. Answer any **three** of the following: 5×3 = 15
  - (a) Write the features of MAC.
  - (b) Discuss the application of Western Blotting.
  - (c) What is the difference between knockout mice and transgenic mice? Which techniques are commonly used for gene knockout in mice? 2+3
  - (d) Write a short note on “DNA microinjection”.
  - (e) Why is Hind II the first restriction enzyme? Taking EcoRI and Hind III explain the nomenclature of Restriction enzyme. 1+4
  
3. Answer any **two** of the following: 10×2 = 20
  - (a) Narrate different types of DNA microarray. State the applications of animal cell culture. 5+5

- (b) Write the principle of Southern blotting. Discuss how the blunt end DNA insert can be modified for ligation into a vector. 5+5
- (c) Write the electroporation and calcium chloride method of transformation. Briefly write on molecular diagnosis of cystic fibrosis. 3+3+4
- (d) How can you construct genomic and c-DNA libraries? Differ genomic and c-DNA library. 6+4

### GROUP-B

#### FISH AND FISHERIES

1. Answer any *five* of the following: 1×5 = 5
- (a) Comment on Mermaid's purse.
- (b) What is sea ranching?
- (c) Give an example of stenohaline fish.
- (d) Name one disease of fishes caused by protozoa.
- (e) What is fish silage?
- (f) What was the first transgenic fish?
- (g) Name one limnivore fish.
- (h) What makes fish bioluminescent?
2. Answer any *three* of the following: 5×3 = 15
- (a) Discuss the anatomy of an electric organ. Write its function. 4+1
- (b) How can you construct a fish aquarium?
- (c) What is bundh breeding? Write its drawbacks. 3+2
- (d) How fish wastes are used as a byproduct? What is fish product? 4+1
- (e) Briefly write on "Zebrafish" which is used as a model organism in research.
3. Answer any *two* of the following: 10×2 = 20
- (a) What is Pen culture? Discuss the different types of enclosures used in pen culture. Write its merits and demerits. 2+4+4
- (b) Differ homocercal and heterocercal tail. Write structural and functional adaptations of fishes for locomotion in water. 2+(4+4)
- (c) Delineate Osmoregulation in Elasmobranchs. Comment on TMAO. Which compound do elasmobranchs use to facilitate osmoregulation? 7+2+1
- (d) What is composite culture? Name a bacterial disease of fish. Write its causative agent. Comment on its symptoms and treatment. 2+1+1+3+3

**GROUP-C**  
**BIOLOGY OF INSECTS**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Write the function of Corneagen cell.
  - (b) Name one viviparous insect.
  - (c) Define Kairomone.
  - (d) Name one Insect with raptorial leg.
  - (e) How  $\alpha$ -trehalose is important in insect body?
  - (f) Write the function of “Jugal Veins”.
  - (g) What is trochantin?
  - (h) Give an example where Genuiculate antennae are found.
2. Answer any *three* questions from the following: 5×3 = 15
- (a) Write a note on Queen substance.
  - (b) Describe the hormonal control of diapause.
  - (c) Write the functions of levators and depressors in insect legs.
  - (d) Briefly discuss sequential digestion in insect.
  - (e) Give a brief description of types and functions of iris cells.
3. Answer any *two* questions from the following: 10×2 = 20
- (a) Describe various types of spiracles present on insect body with diagram. What is “Wigglesworth’s hypothesis”? Write the names of different types of gills present in aquatic insects. 5+3+2
  - (b) Differentiate between hypognathous and opisthorhynchous orientation of Insect head. Write the salient features of Hemiptera, Coleoptera and Siphonaptera. 4+2+2+2
  - (c) Classify the photoreceptor of Insects. Discuss the functions of Corpora cardiaca and Corpora allata. 5+5
  - (d) Illustrate the structural modifications of mouth parts in fluid sucking insects. How many types of Insect antennae and what are they? 6+4

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