Chattogram Veterinary and Animal Sciences University
Faculty of Fisheries
Department of Fish Biology and Biotechnology

MS in Fish Biology and Biotechnology, January-June Semester Final Examination 2022
Course Code: **BAA-501,** Course Title: **Biology of Aquatic Animals**
Total Marks: 40 Time: 2 hours

Answer any **FIVE** questions from the following. Illustrate your answer wherever necessary. The figure in the right margin indicates full marks.

1.	a.	Define osmoregulation.	1
	b.	Differentiate between osmoregulators and osmoconformers with appropriate examples.	2
	c	Illustrate the thermoregulation mechanism in fish.	5
2	a.	Explain the life history events of *Mugil cephalus*.	3
	b.	Differentiate between whale and porpoise.	2
	c.	How do marine mammals enhance the predictability and stability of the marine ecosystems?	3
3	a.	Discuss the migratory pattern and route of *Tenualosa ilisha* in Bangladesh.	6
	b.	What are the physiological changes that occur in migratory fishes before and during migration?	2
4.	a.	Discuss the morphology, food and feeding habit, distribution and mating behavior of spiny soft-shell turtle.	4
	b.	Briefly describe the life history pattern of red tail catfish.	4
5	a.	How do chondrichthyans maintain their buoyancy?	2
	b.	Briefly describe the adaptation of fishes in drought conditions.	3
	c.	Give an account of a semelparous fish.	3
6	a.	Draw the different life cycle stages of mud crab.	2
	b.	What do you know about the adaptive radiation?	2
	c.	Illustrate the spawning behavior of *Penaeus monodon*.	4
7.	a.	Explain the molting patterns of spiny lobster.	3
	b.	How does mantle regulate the shell formation process in bivalve?	3
	c.	Draw the morphological differences between pediveliger and trochophore larvae of green mussel.	2

Chattogram Veterinary and Animal Sciences University
Faculty of Fisheries
Department of Fish Biology and Biotechnology

MS in Fish Biology and Biotechnology, January-June Semester Final Examination 2022
Course Code: **FGE-501,** Course Title: **Fish Genetic Engineering**
Total Marks: 40 Time: 2 hours

Answer any **FIVE** questions. Illustrate your answer wherever necessary. The figure in the right margin indicates full marks.

1. a) What do you understand by genetic engineering and biotechnology? 2.0
   b) Do you think genetic engineering is necessary in everyday life? Justify. 4.0
   c) Enlist five important characters that should choose for genetic engineering in fisheries sciences. 2.0

2. a) What do you understand by blunt end and sticky end? 2.0
   b) BamHI is a restriction enzyme where the enzyme cut is G↓GATCC and creates sticky ends. Find out the recognition sequence of BamHI from the following nucleotide sequence and note down the restriction fragments with its complementary sequences. 3.0

   GTGCGCAAATGGATCCCGATGAATCGAA

   c) Point out the limitations of rDNA technology. 3.0

3. a) Define the following terms: gene, genome, promoter, enhancer and silencer. 5.0
   b) Draw and label a typical gene showing its basic regulatory elements. 3.0

4. a) What do you understand by bioethics and biosafety in genetic engineering? 3.0
   b) Outline and discuss the bioethical issues in genetic engineering. 5.0

5. a) What do you understand by cDNA library and genomic DNA library? Differentiate between them. 4.0
   b) Diagrammatically show the construction procedure of genomic DNA library. 4.0

6. a) What do you know about DNA polymerase? 3.0
   b) What are factors you should consider while designing the primer? 2.0
   c) Design a forward and a reverse primer for the following sequence in the marked position- 3.0

   AAAATGGGAGTTGGGTTGATAACCGGAAAAAGTGTTTGGCCATTGACGACAG
   TCTAGGGATCAGTTACGCCGTTGGCTTTAAGGCTAACTTACATTCTGACTCGG
   ATGAAGCTTTCGGACGCGGGACTGCAGACGGGATTGGGAGTGGAGGCCTTCA
   GGCTTGTAGCCTTTCGGACGAGCGGAGTTCCAACGGAACAAGCTTCGATTTAA
   ACAGAGTCAACTATGAGGAGCCAAGACATGAGGGGTGGAGCGCAAATCTGGC
   GAGAAAGATTGGACCTGTATCATCACCATCATTGTGAA

7. a) What do you understand by transgene and transgenesis? 2.0
   b) Prepare a plan for the production of transgenic *Labeo calbasu* for higher growth. 6.0