

**Chattogram Veterinary and Animal Sciences University, Chattogram**

**Department of Fish Biology and Biotechnology**

**MS in Fish Biology and Biotechnology, Jan-Jun Semester, Final Exam/2019**

**Course No.: AFP- 501 (T), Course Title: Advanced Fish Physiology**

**Time: 2 hrs, Full Marks: 40**

*Answer **any five (05)** from the followings. Figures in the right margin indicate full marks. Split answers are not acceptable.*

1. a. What is fish physiology and how does it differ from fish anatomy? 2.0  
b. How will you apply physiological knowledge in aquaculture. 3.0  
c. 'Knowledge of stress physiology is important in fish production'-explain. 3.0
2. a. What is energy metabolism? 1.0  
b. Describe direct and indirect measurement techniques of energy metabolism in fishes. 5.0  
c. What are the factors affecting metabolism in fish? 2.0
3. a. Write component of fish circulatory system with their functions. 3.0  
b. Describe how countercurrent gaseous exchange takes place in fish. 5.0
4. a. Describe any three anesthetics with their chemical name, doses and precautions. 6.0  
b. "Chemical and non-chemical anesthetics" which one is better as anesthesia- justify your answer. 2.0
5. a. What is stress? Make a list of different stressors in aquatic environment. 2.0  
b. Explain the physiological response to stress in fishes. 3.0  
c. How will you minimize stress in culture fisheries? 3.0
6. a. Define ration. How it is related to fish production? 2.0  
b. Outline the different techniques for measuring growth in fishes. 4.0  
c. Summarize the effects of temperature on the growth of fishes. 2.0
7. a. Explain the typical appearance of fishes at different stages of stress. 4.0  
b. Outline the hormonal changes during stress in aquatic animals. 4.0

**Chattogram Veterinary and Animal Sciences University, Chattogram**

**Department of Fish Biology and Biotechnology**

**MS in Fish Biology and Biotechnology, Jan-Jun Semester/Final Exam-2019**

**Course No.: FEN- 501 (T), Course Title: Fish Endocrinology**

**Time: 2hr, Full Marks: 40**

*Answer **any five (05)** from the followings. Figures in the right margin indicate full marks. Split answers are not acceptable.*

1. a. What is meant by endocrinology and endocrine system? 2.0  
b. "Endocrinology has great scope in artificial breeding of fishes."-Justify the statement. 2.0  
c. Differentiate between endocrine and exocrine glands? 2.0  
d. Show the position of different endocrine glands in fishes. 2.0
2. a. What are the forms of cell signalling? Diagrammatically show the stages of signal transduction. 4.0  
b. Write the secretions of adenohypophyseal lobe of pituitary and their specific functions. 4.0
3. a. "Androgen is a steroid hormone"- Justify your answer. 2.0  
b. Construct a diagram showing the synthesis of peptide hormone in the body of organisms. 4.0  
c. Negative feedback can control the secretion of excess amount of hormone- explain with diagram. 2.0
4. a. Diagrammatically show the HPA and HPG axis in fish? 2.0  
b. Describe how HPG-axis controls the reproduction in fish. 6.0
5. a. "A hormone can be a neurotransmitter"-Defend against your answer. 2.0  
b. "Dopamine is both an inhibitory and excitatory neurotransmitter"- Discuss the statement 2.0  
c. Explain the role of dopamine and serotonin in fishes. 4.0
6. a. Explain the terms: neuroendocrinology, neurosecretory cells, neurotransmitter? 3.0  
b. Discuss the hormonal regulation of steroidogenesis and spermatogenesis in the testis. 5.0
7. a. What do you mean by vitellogenesis and oocyte maturation? 2.0  
b. Integrate the maturation of oocyte and related hormonal control in a diagram. 4.0  
c. How egg-yolk and egg-precursor protein is synthesized? 2.0

**Chittagong Veterinary and Animal Sciences University, Chittagong**  
**Department of Fish Biology and Biotechnology**

MS in Fish Biology and Biotechnology; Jan- Jun Semester, Final Exam/19

Course No & Title.: **PCG- 501 (T), Fish Population and Conservation Genetics**

Total Marks-40, Time: 2 hours

*Answer **any five (05)** from the following. Figures in the right margins indicate full marks. Split answer is not acceptable.*

1. a) What do you mean by genetic management and conservation of fish population? 3.0  
b) How will you use molecular markers in genetic study and conservation of fish population? 5.0
  
2. a) What is Hardy Weinberg Equilibrium? Explain the factors to be responsible for causing deviation of gene and genotype frequencies from HWE. 4.0  
b) Explain the HWE law with an example from fish. 4.0
  
- Q 3. a) What is genetic marker? Make a list of genetic marker widely used in fisheries research. 3.0  
b) Explain the principle of RFLP. Write the advantages and disadvantages of RFLP marker. 5.0
  
- Q 4. a) Write the theory and principle of electrophoresis. 3.0  
b) Discuss the steps for protein separation with diagram. 5.0
  
- Q 5. a) What is microsatellite? Write its principle. 3.0  
b) Make a comparison between RFLP, RAPD and Microsatellite marker. 2.0  
c) Which marker is best for genetic study of fish? Explain why. 3.0
  
- Q 6. a) Explain the factors affecting gene and genotype frequency in a population. 3.0  
b) Explain the effect of genetic drift with examples. 5.0
  
- Q 7. a) What do you mean by natural hybridization and gene introgression in fishes? 2.0  
b) What are the factors promoting natural hybridization in fishes? 2.0  
c) Explain the negative impacts of hybridization in fishes. 4.0
  
- Q 8. a) What do you mean by genetic distance? What are the bases of genetic distance? 2.0  
b) Explain the Nei's standard genetic distance method as a measure of genetic distance. 6.0

  
02.07.19

  
02.07.19

**Chattogram Veterinary and Animal Sciences University, Chattogram**  
**Department of Fish Biology and Biotechnology**  
 MS in Fish Biology and Biotechnology; Jan- Jun Semester, Final Exam/19  
**Course No&Title.: RDA- 501 (T), Research Design and Genetic Data Analysis**  
 Total Marks-40, Time: 2 hours

Answer **any five (05)** from the followings. Figures in the right margin indicate full marks. Split answers are not acceptable.

1. a) What is an experiment? Describe the basic principles of an experimental design. 3.0  
 b) Explain completely randomized design with example. 5.0
2. a) What is regression co-efficient and paired sample T-test? Give examples of different types of data from the fisheries science. 4.0  
 b) What do you mean by standard deviation and standard error? What are the importance of standard deviation and standard error in biological research? 4.0
3. a) What do you know about ANOVA? Write the advantages of ANOVA. 2.0  
 b) How will you compute one-way ANOVA? 6.0
4. a) What is phylogeny and phylogenetic tree? Illustrate the different parts of a phylogenetic tree. 3.0  
 b) What is phylogenetic classification? Mention the general steps of phylogenetic tree construction. 3.0  
 c) Mention the advantages and disadvantages of distance matrix method. 2.0
5. a) What is linkage disequilibrium? What are the reasons of linkage disequilibrium? 4.0  
 b) How is linkage disequilibrium and evolution interlinked? 4.0
6. a) What is Chi-Square test? How will you calculate Chi-Square ( $\chi^2$ ) statistic? 2.0  
 b) What is goodness of fit test? Mention the advantages and limitations of Chi-square test? 2.0  
 c) Coral fish have two forms of hemoglobin determined by alleles 'a' and 'b' at one locus. A sample of coral fish taken from the Bay of Bengal had the following frequencies of the three genotypes: aa= 130; ab= 763; bb= 1698; total= 2591. 4.0  
     i) Are these frequencies compatible with the sample having been drawn from a random mating population?  
     ii) What do they suggest about the breeding structure of the population?
7. a) What is one way ANOVA? 1.0  
 b) The following table shows the weight (g) of a fish species in four different situations (using four different feeding regimes, FR). Determine if the mean weight of the four groups significantly differs ( $F_{3,36}=2.88$ ; at 5% level of significance). 7.0

Wt. (g) with FR1	Wt. (g) with FR2	Wt. (g) with FR3	Wt. (g) with FR4
130	122	134	108
128	128	129	112
124	125	133	113
126	127	131	113
130	133	133	116
130	125	136	108
125	128	127	112
132	120	129	110
122	129	132	114
123	119	135	112

**Chattogram Veterinary and Animal Sciences University, Chattogram**

**Department of Fish Biology and Biotechnology**

**MS in Fish Biology and Biotechnology, Jan-Jun semester, Final Exam/2019**

**Course No.: BAA- 501 (T), Course Title: Biology of Aquatic Animals**

**Time: 2hour, Full Marks: 40**

Answer **any five (05)** from the followings. Figures in the right margins indicate full marks. Split answers are not acceptable.

1. a. Justify the significance of studying biology of aquatic animals in context of Bangladesh. 4.0
- b. 'Study of breeding biology is prior to artificial breeding.'-Justify. 2.0
- c. Assess the feasibility of mussel and oyster culture in Bangladesh. 2.0
2. a. Write notes on food, feeding habit and reproduction of lobster. 3.0
- b. Describe the life cycle of lobster, *Panulirus polyphagus* with diagram. 5.0
3. a. What is hibernation and aestivation? 2.0
- b. How you will differentiate between male and female frog? 2.0
- c. Summarize the life cycle events of frog with necessary figure. 4.0
4. a. What do you mean by spat, veliger, PL and zoea? 2.0
- b. Explain the reproduction and larval developmental stages of giant tiger shrimp, *Penaeus monodon*. 4.0
- c. Differentiate between shrimp and prawn. 2.0
5. a. What do you mean by protandry, protogyny and hermaphroditism? 2.0
- b. Explain the pearl formation mechanisms in Oyster. 4.0
- c. Diagrammatically show the life cycle of *Crassostrea gigas*. 2.0
6. a. What do you know about sexuality and migratory pattern of *Lates calcarifer*. 3.0
- b. Illustrate the life cycle of *Lates calcarifer*. 5.0
7. a. What is migration? What are the types of migration found in fish? 2.0
- b. Identify the causes of fish migration? 2.0
- c. Explain the migratory pattern of *Tenualosa ilisha*. 4.0

**Chattogram Veterinary and Animal Sciences University, Chattogram**

**Department of Fish Biology and Biotechnology**

**MS in Fish Biology and Biotechnology; Jan- Jun Semester, Final Exam/19**

**Course No & Title.: FGE- 501 (T), Fish Genetic Engineering**

**Total Marks-40, Time: 2 hours**

*Answer **any 05 (five)** questions from the followings. Figures in the right margin indicate full marks.*

1. a) Discuss the prospects and applications of genetic engineering in fisheries. 5.0  
b) Explain fish as model animal for genetic engineering and biotechnology. 3.0
2. a) Write the basic steps of gene cloning. 2.0  
b) How will you produce and screen cDNA library? 6.0
3. a) What do you mean by In-Situ Hybridization? 1.0  
b) Write the principle of Fluorescence In Situ Hybridization (FISH). 3.0  
c) What are the procedural steps of Genomic In Situ Hybridization (GISH)? 4.0
4. a) What are the basic requirements for recombinant DNA technology? Write the principle of rDNA technology. 4.0  
b) Illustrate the basic steps to create recombinant DNA. 4.0
5. a) What is transgenesis? Make a list of gene transfer technology. Is transgenic fish safe for human consumption? 3.0  
b) Explain any two of gene transfer techniques which you will use to produce transgenic fish. 5.0
6. a) What is blotting? Mention different blotting techniques with their purpose. 2.0  
b) Write the principle of Southern blotting. Write its applications. 4.0  
c) Differentiate between Southern and Western blotting technique. 2.0
7. a) How will you extract and quantify DNA in laboratory? 4.0  
b) Explain any two labeling technique of nucleic acid. 4.0