

**Chattogram Veterinary and Animal Sciences University, Chattogram**  
**Faculty of Fisheries**

B. Sc. Fisheries (Hons.) Year -03 Semester-01, Final Examination' 2022  
Course No: **IFM-301 (T)**, Course Title: **Inland Fisheries Management (Theory)**  
Total Marks: 70, Time: 3 hours

*Answer any **5 (five)** questions from each section. Figures in the right margin indicate full mark. Use separate answer script for each section.*

**Section-A**

- |    |    |  |   |
|----|----|--|---|
| 1. | a) | What do you mean by inland waterbody?  | 1 |
|    | b) | Write down the multipurpose use of inland waterbodies.   | 3 |
|    | c) | What are the challenges of managing inland fisheries?  | 3 |
| 2. | a. | Define fisheries regulation.   | 2 |
|    | b. | Describe the theories of fisheries regulation.   | 5 |
| 3. | a. | Define habitat and habitat restoration.  | 2 |
|    | b. | How will you restore or improve a degraded fresh water fish habitat?   | 5 |
| 4. | a) | List down the sanctuaries of Hilsa fish in Bangladesh.   | 2 |
|    | b) | Mention the characteristics of fish you need to know before the formulation of its management protocol.        | 2 |
|    | c) | Show the major spawning grounds of Hilsa in the map of Bangladesh.   | 3 |
| 5. | a) | Why is Hilsa fishery so important for economy of Bangladesh?   | 3 |
|    | b) | Write down the current government strategies for the management of Hilsa fishery.                              | 4 |
| 6. | a) | Define Recreational fishery.   | 2 |
|    | b) | Write down the social, economic and environmental impacts of recreational fishery.                             | 5 |
| 7. |    | Develop an ecosystem-based management plan to ensure sustainable uses of the aquatic resources of Kaptai Lake. | 7 |

**Section B**

- |     |    |  |   |
|-----|----|--|---|
| 8.  | a) | Why fisheries management is so important?  | 2 |
|     | b) | Briefly discuss different types of fisheries regulation.                               | 5 |
| 9.  | a) | “Sustainability is a concept often paraphrased as don’t cheat your kids”- justify.     | 3 |
|     | b) | Point out the primary considerations for sustainable fisheries Management.             | 4 |
| 10. | a) | Define CBFM with an example.   | 2 |
|     | b) | Enlist basic principles of fisheries cooperatives.                                     | 2 |
|     | c) | Discuss the role of the government organizations in the fisheries cooperatives.        | 3 |
| 11. | a) | Differentiate between conservation and preservation.                                   | 2 |
|     | b) | Enlist different types of assets with examples.  | 2 |
|     | c) | Discuss management conflicts found in recreational fisheries.                          | 3 |
| 12. |    | Analyse SWOT to develop a cooperative society for the Halda River fisherman community. | 7 |
| 13. | a. | What do you know about the life history (LH) data of a fish species?                   | 2 |
|     | b. | Why are LH data important for formulating effective fisheries management strategies?   | 5 |
| 14. | a. | What are the key indicators to assess the achievement of sustainable livelihoods?      | 2 |
|     | b. | Briefly describe sustainable livelihood framework for managing fisheries resources.    | 5 |

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B. Sc. Fisheries (Hons.) Year -03, Semester-01, Final Examination' 2022  
Course No: APT 301 (T), Course Title: **Aquatic Pollution and Toxicology (Theory)**  
Total Marks: 70, Time: 3 hours

*Answer any 5 (five) questions from each section. Figures in the right margin indicate full marks. Use a separate answer script for each section.*

**Section-A**

1. a) What is aquatic pollution? Characterize the water pollution 3.0  
b) Discuss the major sources of pollution in the marine environment of Bangladesh. 4.0
2. a) Discuss the key features of the dead zone in the Bay of Bengal. 2.0  
b) Diagrammatically discuss the simplified model of a dead zone formation in an aquatic environment. 3.0  
c) How the large-scale upwelling in the ocean environment leads to the formation of the dead zone? 2.0
3. a) Differentiate between bioaccumulation and biomagnification. 2.0  
b) Describe the bioaccumulation and bio-magnification process of DDT in the marine food chain. 5.0
4. a) Enlist the twelve major issues identified by the National Program of Actions, 1999 for regulating water pollution. 2.0  
b) Discuss the major national and international regulations for controlling pollution of the ocean environment. 5.0
5. a) Compare and contrast between primary and secondary microplastics. 2.0  
b) Diagrammatically show the microplastic transport pathways in the ocean environment. 2.0  
c) Briefly discuss the major challenges of controlling microplastic pollution in the ocean environment. 3.0
6. a) Define Toxicology. Why aquatic organisms affected by toxicity? 3.0  
b) Why PCBs and PAHs considered as hazardous pollutants for living organisms? 4.0
7. Write short notes on any 02 (two) the following: 3.5×2 = 7.0  
a) Trickling filters; b) Ship-breaking pollution; and c) National Environment Policy 1992.

**Section-B**

8. a) How can you interrelate pollution and contamination of the aquatic environment? 2.0  
b) How blast water and bilge water can impact marine ecosystems? 2.0  
c) Discuss the biological adaptations of marine organisms to hypoxic and anoxic conditions. 3.0
9. a) What are the toxicological properties of heavy metals? 2.0  
b) Why Bangladeshi people are more vulnerable to Pb toxicity from fish origin? 2.0  
c) What are the sources and impacts of Hg pollution in aquatic ecosystems? 3.0
10. a) What do you mean by radioactive pollution? Discuss the various sources of radioactive pollution for the oceanic environment. 4.0  
b) What are the impacts of radioactive pollution on aquatic ecosystems and how it can be minimized? 3.0
11. a) What kind of aquatic creatures are more vulnerable to oil spill pollution? 1.0  
b) Briefly discuss the fate of the oil spill in an aquatic environment. 4.0  
c) How can you minimize the impact of an accidental oil spill in an aquatic environment? 2.0
12. a) What is a flocculant? Enlist the major natural and synthetic flocculants use to remove suspended solid particles from the wastewater. 3.0  
b) Discuss suspended solids removal techniques from the wastewater by using filtration devices. 4.0
13. a) Define ecological indicators. 2.0  
b) Discuss the biodegradation process of microplastic in the ocean environment under both abiotic and biotic conditions. 5.0
14. Write short notes on any 02 (two) the following: 3.5×2 = 7.0  
a) Harmful algal bloom; b) PoPs; and c) Metalloprotein.

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B.Sc. Fisheries (Hons.) Year - 3 Semester - 1 (January-June), Final Examination, 2022  
**Course No: IOA 301 (T), Course Title: Integrated & Organic Aquafarming (Theory)**  
Full Marks: 70; Time: 3 hours

*Answer **any 5 (five)** questions from each section. Figures in the right margin indicate full marks. Use separate answer script for each section.*

**Section-A**

1. a. What do you mean by 'integrated and organic aquafarming'? 4  
b. Discuss the types of global integrated aquafarming system.. 3
2. a. Write the criteria of the complex integrated system 5  
b. Describe the integrated system of plant-animal-fish culture. 2
3. a. What do you mean by 'nutrient transfer efficiency' and 'waste loading'? 2  
b. Draw a diagram of rice-fish integrated systems. 5
4. a. Discuss the characteristics of organic farming. 2  
b. 'Fish is an important component in integrated system'- discuss the statement. 5
5. a. Write down the different action of wastes on fish pond. 4  
b. Illustrate the constraints to animal and fish integration. 3
6. a. What are the basic components of plant-fish integrated system? 3  
b. Write down the advantages and disadvantages of organic aquaculture in Bangladesh. 4
7. Write short notes on **any 02 (two)** of the following: 3.5x2=7  
i) Integrated Horticulture-Fish System; ii) Multi-component integrated system and  
iii) Types of aquaponics systems.

**Section B**

8. a. What are the main factors affecting the plants in the rice field during rice-fish integrated culture? 2  
b. Write down the symptom, causes, prevention and treatment of fish disease during rice-fish integrated culture. 5
9. "Several physical modifications have been devised over the years in order to make the rice field better suited for fish culture" – explain those physical modifications. 7
10. a. Write down the objectives of planning management for integrated aquafarming 2  
b. What are the areas need to be covered by a long-term and yearly planning for an integrated aquafarming? 5
11. a. Define organic aquaculture. Illustrate the advantages and disadvantages of organic aquaculture in Bangladesh. 5  
b. List out some recommendations for enhancing the adoption of organic aquaculture in Bangladesh. 2
12. a. Explain in details the integrated fish-livestock farming system. 4  
b. Economic viability of Integrated Horticulture-Fish System. 3
13. a. Define Aquaponics. Write down the advantages and disadvantages of aquaponics. 3  
b. Illustrate the main factors for a successful aquaponics system. 4
14. Write short notes on **any 02 (two)** of the following: 3.5x2=7  
i) Integrated multi-trophic aquaculture (IMTA) ; ii) Components of an aquaponic system and iii) Crustacean's culture in Rice Field.

Chattogram Veterinary and Animal Sciences University, Chattogram

Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year -3, Semester-1 (January-June), Final Examination' 2022

Course No: FGE-301 (T), Course Title: **Fundamentals of Genetics (Theory)**

Total Marks: 70 Time: 3 hours

Answer any 5 (five) questions from each section. Illustrate your answer wherever necessary. Figures in the right margin indicate full mark. Use separate answer script for each section.

**Section-A**

1. a) What do you understand by the term genetics? 1  
b) How will you assess the relationships of heredity and variation with genetics? 2  
c) Mention the significance of studying genetics in the field of fisheries science. 4
2. a) "Cell is the basic biological unit in living organisms"- Explain. 2  
b) Differentiate between prokaryotic and eukaryotic cell. 2  
c) Draw and label a typical animal cell. 3
3. a) What do you know about gene, allele, genome, and gene pool? 2  
b) "DNA forms the chemical basis of heredity"- Justify. 2  
c) Briefly describe the process of DNA packaging in chromosome. 3
4. a) 'Mendel's 2<sup>nd</sup> law of inheritance is applicable for alleles of homologous chromosomes'-do you agree? Why? 2  
b) Suppose, there are 3 types of colour in Platy fish: (1) Albino, (2) Red, and (3) Green. A cross (at P<sub>0</sub>) between Albino × Red is made. Albino (A) is dominant over Red (R) as well as over green (r) and Red is dominant over green. 'R' locus expresses only when the other locus has recessive homozygous alleles.  
(i) To make an F<sub>1</sub> (Albino) heterozygote for both loci, what will be the genotypes of parents (P<sub>0</sub>)?  
(ii) What will be the phenotypic ratio for the gene interactions of A × R, a × R, and a × r?  
(iii) What will be the F<sub>2</sub> genotypic ratio and genotypic classes? 5
5. a) What do you know about gene and genotype frequency? 1  
b) Narrate the factors affecting the gene and genotype frequencies. 2  
c) Explain the Hardy-Weinberg equilibrium with example. 4
6. a) In Pea plants, the allele for tall stalks (T) is dominant over the allele for short stalks (t). Suppose a cross between a tall Pea plant and a short Pea plant produces over 95% of the progeny tall.  
i) What are the genotypes of the parents? and ii) What will be the phenotypic ratio in F<sub>2</sub>? 2  
b) Three genes (a, b, c) were found to stay together on a chromosome for a few generations. Illustrate the genotype ratio by test crossing (the male was heterozygous parent). 3  
c) Explain with an example how you would differentiate penetrance and expressivity. 2
7. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7  
a) Cell cycle, b) Genetic environment interaction variance, and c) Lethal gene action.

**Section-B**

8. a) Mention the changes observed during telophase stage of cell division. 2  
b) Differentiate between cytokinesis and karyokinesis. 2  
c) Compare and contrast the most signifying difference of two types of cell division observed in fish. 3
9. a) Draw a chromosome highlighting its centromeric, sub-telomeric and telomeric position. 3  
b) Give an account of the aberrations of the chromosome set (or number) observed in diploid organisms. 4
10. a) In a cross of AaBb × AaBb, what fraction of the offspring can be expected to express two dominant alleles at both loci? Illustrate with cross details. 2  
b) State the Mendel's law of segregation and illustrate recessive epistasis with an example. 5
11. a) What do you understand by sex linked, sex limited and sex influenced traits? 3  
b) Discuss the phenotypic expression of baldness in male by sex influenced traits. 4
12. a) What do you know about quantitative phenotype? 1  
b) Why quantitative phenotype exhibits continuous distribution? 2  
c) V<sub>D</sub> can't be inherited- Justify. 2  
d) Enlist the major techniques used for calculation of h<sup>2</sup>. 2
13. a) Summarize your knowledge on sex differentiation mechanism using appropriate example. 3  
b) Briefly describe the sex determination systems found in different group of fishes. 4
14. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7  
a) Peroxisome, b), Scale pattern in common carp, and c) Crossing over and recombination.

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**B. Sc. Fisheries (Hons.), Year-03, Semester-01 (January-June), Final Examination' 2022**  
**Course No. FPR- 301(T), Course Title: Fish Processing (Theory)**  
**Total Marks: 70, Time: 3 hours**

*Figures in the right margin indicate full mark. Answer any 5 (five) questions from each section. Use separate answer script for each section.*

**Section-A**

1. a) Define spoilage. Briefly describe the influencing factors for fish spoilage. Discuss the role of processing in minimizing fish spoilage. 4  
b) Discuss the marine fish marketing channel practices in Bangladesh. 3
2. a) What is rigor-mortis of fish? Schematically show the post-mortem changes in fish. 4  
b) Explain the changes in organic phosphate in fish body during rigor mortis. 3
3. a) Write down the physical and chemical characteristics of smoke. 3  
b) Discuss the problems associated with conventional smoking of shrimp. Give your suggestions to improve the smoked shrimp product. 4
4. a) Define fish freezing. Describe the protocol of air-blast freezing method. 3  
b) Describe briefly about the quality changes associated with freezing and cold storage of fish. 4
5. a) What is double seaming? Differentiate between commercial sterility and complete sterility. 3  
b) Define fish canning. Discuss briefly the operational procedures followed in tuna canning industry. 4
6. a) What is fish fermentation? Differentiate between semi-fermented and full fermented products. 3  
b) Briefly describe the *Nga-pi* production process in Bangladesh. 4
7. a) Packaging can play a crucial role in maintaining the quality of fish products-justify. 3  
b) Define MAP. Describe briefly the advantages and disadvantages of MAP for fish products. 4

**Section-B**

8. a) What do you know about the bio-factors of fish? Discuss the role of bio-factors on human health. 3  
b) Discuss the technical problems associated with fish drying with their preventive measures. 4
9. a) Define water activity ( $a_w$ ). Water activity is directly related with microbial growth-justify. 3  
b) Discuss briefly the mechanical drying methods of fish. 4
10. a) Explain the principle of salting.  $Na^+$ ,  $Mg^{++}$  and  $Ca^{++}$  relates the quality of fish salting-justify. 3  
b) What is fish salting? Give a scheme for the preparation of dry salted *Hilsa* in Bangladesh. 4
11. a) Explain the terms: D-value, F-value, Z-value, and 12D concept. 3  
b) Describe the problems associated with canned fishery products. 4
12. a) What do you know about fish freezing curve and thermal arrest time? 3  
b) Calculate the total energy required to freeze 20 kg shrimp of  $30^\circ C$  at  $-40^\circ C$  by a spiral freezer. 4
13. a) Discuss briefly the use of retort pouch in can industry with its advantages and disadvantages. 3  
b) Describe the chemical and microbial spoilages of canned products. 4
14. Write down short notes any TWO of the followings: 3.5 x 2 = 7  
a) Case hardening; b) Pink and Dun spoilage; and c) IQF of shrimp.

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**B. Sc. Fisheries (Hons.) Year-3, Semester-1, Final Examination' 2022**

**Course No: RSO-301 (T), Course Title: Rural Sociology (Theory)**

**Total Marks: 70 Time: 3 hours**

*Answer any 5 (five) questions from each section. Figures in the right margin indicate full mark. Use separate answer script for each section.*

**SECTION-A**

1. a) What do you mean by social control? 2  
b) What rules are played by the various agencies in raising public opinion? 5
2. a) Mention some common social problems in Bangladesh. 3  
b) Give some suggestions for juvenile delinquency in slum area. 4
3. a) Define the concept of "Culture". 2  
b) Discuss the concept of cultural lag with example in context of Bangladesh. 5
4. a) Illustrate sustainable development? 2  
b) What role should the fisheries sector play to maintain sustainable development in Bangladesh? 5
5. a) What is the difference between "Caste" and "Class"? 3  
b) Show that "Caste is an institution as well as an organization". 4
6. a) What do you mean by social change? 2  
b) Discuss the factors responsible for social change in Bangladesh. 5
7. Write short notes on any two of the following: 3.5 x 2=7  
a) Personality  
b) Agro-fishery, and  
c) Urbanization.

**SECTION- B**

8. a) What are the objectives of sustainable livelihood? 3  
b) Explain the core concepts of livelihood. 4
9. a) Explain the difference between social development and social progress. 3  
b) Briefly discuss the objectives of integrated farming system. 4
10. a) What are the categories of migration? 3  
b) Explain the cause and effects of migration. 4
11. a) Briefly discuss the characteristics of "Institution". 3  
b) Differentiate between Association and Institution. 4
12. a) Write down the basic characteristics of agrarian societies. 3  
b) Briefly discuss the role of GO, NGO and private sector towards agro-fishery industry development in Bangladesh. 4
13. a) Distinguish between structured and non-structured questionnaire. 3  
b) Briefly discuss the steps for conducting social research. 4
14. a) Illustrate gender discrimination. 2  
b) What are the causes of gender discrimination in the fisheries sector of Bangladesh? 5

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B.Sc. Fisheries (Hons.) Year - 3 Semester - 1 (January-June), Final Examination, 2022

**Course No: FPL 301 (T), Course Title: Fish Pathology (Theory)**

Total Marks: 70; Time: 3 hours

*Answer any 5 (five) questions from each section. Figures in the right margin indicate full marks. Use separate answer script for each section.*

**Section-A**

1. a. Define stress, Infection and Infestation. Write down the biological, chemical, physical and procedural environmental factors which can adversely impact fish culture and cause stress. 2
- b. Explain in details the primary, secondary and tertiary effects in the fish due to stress. 5
2. a. Define infection and systemic pathology. 1
- b. Why studies on 'Fish Pathology' is important? 3
- c. Define disease. Describe factors producing diseases in fish. 3
3. a. Define virus and cell line. 2
- b. Describe KHV with its etiology, epizootiology, symptoms, pathology, diagnosis and control measures. 5
4. a. What is a bacterium? List down some important bacterial diseases in aquaculture with their causative agents. 2
- b. Describe vibriosis and columnaris with their etiology, epizootiology, symptoms, and Pathology. 5
5. a. What do you know about the stressors that have negative impacts on shrimp culture? 1
- b. Briefly discuss about the most common syndrome in shrimp culture of Bangladesh with their distribution, transmission, epizootiology, pathology, diagnosis and preventive measures. 6
6. a. Define SPF and SPR. Illustrate the steps of shrimp SPF stock development. 3
- b. Briefly discuss about luminous bacterial disease in shrimp culture. 4
7. Write short notes on **any 02 (two)** of the following: 3.5x2=7
- i) Significance of Fish Pathology; ii) Auto-immune disease and iii) MAS.

**Section B**

8. a. Write down the importance of shellfish diseases. 2
- b. Illustrate the diseases producing factors in shrimp. 2
- c. List down the indication of shellfish health and diseases. 3
9. a. Write down the clinical observation of Furunculosis disease in fish. 2
- b. Describe Saprolegniasis with it's clinical signs, pathology and diagnosis. 5
10. a. "There are several cells in the epidermis"- write down their name, characteristics and function. 5
- b. Write down the function of gill, kidney and liver. 2
11. a. Define virus. Write down the inactivation methods of virus. 3
- b. Describe SVC or VHS with its etiology, clinical signs, epizootiology histopathology and diagnosis. 4
12. a. Define stress and mention the stages of stress. 3
- b. Discuss about the factors responsible for stress in fish. 4
13. a. Write down the different types of tumor. What are the factors responsible for development of a tumor? 3
- b. Compare the primary differences between benign and malignant tumors. 4
14. Write short notes on **any 02 (two)** of the following: 3.5x2=7
- i) Filamentous Bacterial Disease; ii) Gaffkemia and iii) Rickettsial infection of penaeid shrimp.

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B. Sc. Fisheries (Hons.) Year -3, Semester-1 (January-June), Final Examination' 2022

Course No: SFB-301 (T), Course Title: **Shellfish Biology (Theory)**

Total Marks: 70 Time: 3 hours

Answer any 5 (five) questions from each section. Illustrate your answer wherever necessary. Figures in the right margin indicate full mark. Use separate answer script for each section.

**Section-A**

1. a) What do you mean by shellfish? 1  
b) Briefly describe the present status of shellfish resources of Bangladesh. 3  
c) Enlist eight commercially important shellfishes available in Bangladesh with their common and scientific names. 3
2. a) What is meant by Mollusca? 1  
b) What do you know about Molluscan body plan? 2  
c) Describe the life cycle of freshwater mussels with diagram. 4
3. a) Compare and contrast between the following pairs: (i) mud crab and fiddler crab, (ii) trochophore and veliger larvae. 4  
b) Describe the factors affecting the life of shellfishes in aquatic environments. 3
4. a) Differentiate a freshwater giant prawn from a marine tiger shrimp. 2  
b) Describe the mating process of *Penaeus monodon* with diagram. 3  
c) Sketch the developmental stages of shrimp. 2
5. a) Name four bivalves available in the Cox's Bazar coast. 2  
b) Write down the morphological features of oyster. 2  
c) What do you know about the shell formation of *Crassostrea* sp. 3
6. a) What is meant by Cephalopoda? 1  
b) Write down the economic importance of Cephalopods. 2  
c) Illustrate the life cycle of *Sepia* sp. 4
7. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7  
a) Mantis shrimp, b) Shellfish as bioindicators, and c) Use of shellfish in angling.

**Section-B**

8. a) What are the causes of decreasing shellfish resources in Bangladesh? 2  
b) Briefly describe the environmental factors that affect the abundance and biodiversity of shellfish. 5
9. a) Write the food and feeding habit, age, and growth of horseshoe crab. 2  
b) How can you identify the sexual dimorphism of horseshoe crab? 3  
c) "Krills are the keystone species of marine ecosystem"-explain. 2
10. a) "Octopus is a semelparous species"-explain the statement. 2  
b) Give an account of the Octopus intelligence. 2  
c) Describe the different feeding pattern of Octopus. 3
11. a) Define ecdysis. 1  
b) Illustrate the stages of ecdysis of *Macrobrachium rosenbergii*. 6
12. a) What is meant by the nacre? 2  
b) How does blister pearl and free pearl are formed in clam? 5
13. a) Relate the molting of mud crabs with temperature and salinity. 3  
b) Discuss the larval development of mud crab with figures. 4
14. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7  
a) Tusk shell, b) Mitigation of shellfish biodiversity loss, and c) Reproduction of *Pila* sp.