

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B. Sc. Fisheries (Hons.), Year-04, Semester-01, Final Examination' 2023

Course No. RAS-301(T), Course Title: Rural Sociology (Theory)

Total Marks: 70, Time: 3 hours

Figures in the right margin indicate full mark. Answer any 05 (five) questions from each section. Use separate answer script for each section.

Section-A

1. a) What do you mean by sociology and society? 3
b) What are the advantages and objectives of studying sociology? 4
2. a) What is culture of poverty? 3
b) Discuss the various components of culture. 4
3. a) How do social activities relate to environmental pollution? 3
b) Narrate the factors of human development. 4
4. a) Discuss the main differences between rural and urban communities. 3
b) Discuss the factors responsible for the social changes in Bangladesh. 4
5. a) Write down the characteristics of culture. 3
b) "Geographical factors influence our social life" – explain the statement in context of Bangladesh. 4
6. a) Define organization, institution and association. 3
b) 'Chattogram Veterinary and Animal Science University' is an organization – do you agree? 4
7. a) Write down the objectives of social survey. 3
b) Discuss various types of social survey? 4

Section-B

8. a) Write down the basic characteristics of agrarian societies. 3
b) Why do the rural people migrate to the urban areas? Explain. 4
9. a) What are the objectives of sustainable livelihood? 3
b) Explain the core concepts of livelihood. 4
10. a) Define and state the objectives of integrated farming system. 3
b) Explain the different kinds of resources. 4
11. a) What are the categories of migration? 3
b) Explain the causes and effects of migration? 4
12. a) Explain the concept of 'gendered division of labour'. 3
b) 'Gender' is a social construction – explain the statement. 4
13. a) Discuss the characteristic features of artisanal fisheries. 3
b) Briefly explain the contribution of artisanal fisheries in the Bangladesh economy. 4
14. Write short notes on any two of the following: 3.5x2=7
a) Scientific research b) Migration c) TYSEN

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B.Sc. Fisheries (Hons.) Year-03, Semester-01; Final Examination, 2023
Course Code: IFM-301 (T), Course Title: Inland Fisheries Management (Theory)

Full marks: 70; Time: 3 hours

*Answer **any 05 (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 "Inland water bodies" and "Inland fisheries management." 2
b) Write down the objectives of inland fisheries management. 3
c) Enlist components of fisheries management. 2
2. a) What are the objectives of habitat improvement? 3
b) "Habitat improvement is a fisheries management tool"- Explain this statement. 4
3. a) Define fishery regulation. 2
b) Discuss the theories of fishery regulation. 5
4. a) "A cooperative does not aim to earn benefit like other type of organizations"- Justify. 2
b) Write down the possible problems of fisheries cooperatives and provides solutions to overcome those problems. 5
5. a) Why are Hilsa declared as GI for Bangladesh? 2
b) Write down the Hilsa fishing technique and practices in Bangladesh. 3
c) Enlist the Alternative Income Generating Activities for male and female of Hilsa fishers. 2
6. a) Define fish pass. 1
b) Why do fish need fish passes? 2
c) Discuss the three key elements of successful fish pass design. 4
7. Develop a model of fishery-based ecotourism management for Bangladesh. 7

Section B

8. a) "Inland fisheries provide a sense of community identification and occupational attachment"- Justify this statement. 2
b) Classify fish species based on mode of reproduction. 3
c) What are the different types of inland waterbodies in Bangladesh? 2
9. a) Differentiate between habitat improvement and habitat restoration. 2
b) Give your idea to restore habitat in the Karnafully River, Bangladesh. 5
10. a) "Community-based management can be a more holistic approach to fisheries management"- Justify this statement. 3
b) Write down the general principles of community-based fisheries management. 4
11. a) What are the problems of Hilsa fishery management in Bangladesh? 3
b) Briefly describe the impacts of seasonal ban of Hilsa fishing on the livelihood of hilsa fisherman. 4
12. a) What is recreational fishery? 2
b) How recreational fisheries promote mutual understanding between urban dwellers and fishermen? 2
c) Give the possible suggestions for the development of recreational fisheries in Bangladesh. 3
13. a) "Co-management is economical than centralized management systems"- Justify. 2
b) Illustrate the key players in co-management. 3
c) Enlist the types of co-management. 2
14. Make a plan for the sustainable fisheries management in the Kaptai lake, Bangladesh. 7

Chattogram Veterinary and Animal Sciences University, Chattogram
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B.Sc. Fisheries (Hons.) Year-03, Semester-01; Final Examination, 2023

Course Code: IOA-301 (T), Course Title: Integrated and Organic Aquafarming (Theory)

Full marks: 70; Time: 3 hours

*Answer **any 05 (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 aquaculture'? 2
b) Discuss the present status of integrated aquaculture in Bangladesh. 5
2. a) Why integrated aquaculture system is sometimes complex? 2
b) Describe the integrated system of waste-plant-fish culture. 5
3. a) What are the points need to emphasize for maintaining biosecurity in an intensive farm? 3
b) Write down the general procedures followed to maintain biosecurity in an intensive farm. 4
4. a) What do you mean by autotrophic and heterotrophic systems? 4
b) Illustrate the overview of energy budgeting process in integrated aqua farming systems. 3
5. a) Write down the necessity of planning management in aquaculture. 4
b) There are two major types of planning system of management – discuss in details. 3
6. a) List out the benefits of duck-fish integration. 2
b) Write down the factors affecting the duck-fish integrated culture. 5
7. a) Write short notes on any 02 (two) of the following: 3.5×2=7
a) Organic Certificate system b) Waste management in aquaculture and c) Hydroponics system.

Section B

8. a) Define organic aquaculture. Illustrate the advantages and disadvantages of organic aquaculture in Bangladesh. 1+4
b) List out some recommendations for enhancing the adoption of organic aquaculture in Bangladesh. 2
9. a) Define 'fish husbandry'. 2
b) Discuss the principles of aeration and their practices in organic aquaculture. 5
10. a) What are the basic components of fish-animal integrated system? 3
b) Write down the advantage and disadvantages of aquaponic system in Bangladesh. 4
11. a) What are the major sources of water in organic aquaculture? 2
b) Discuss the cost-benefit analysis of any integrated aqua farming system. 5
12. a) Discuss the concept of integrated horticulture-fish production in aquaculture. 2
b) Market outlook and consumer trends are the key components of aquaculture business- discuss the statement? 5
13. "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
14. Write short notes on any 02 (two) of the following: 3.5×2=7
a) Integrated multi-trophic aquaculture (IMTA); b) Crustacean's culture in Rice Field and c) Poly culture.

Chattogram Veterinary and Animal Sciences University, Chattogram
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B. Sc. Fisheries (Hons.) Year-03, Semester-01; Final Examination, 2023

Course Code: FPR- 301(T) Course Title: Fish Processing (Theory)

Full marks: 70; Time: 3 hours

*Answer **any 05 (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 is fish processing? Mention the importance of studying fish processing. 3
b) Discuss briefly types of post-harvest losses found in fish. How to reduce such post-harvest losses? 4
2. a) Define rigor-mortis with example. Draw a schematic diagram on post-mortem changes of fish. 4
b) Explain the changes in organic phosphate in fish body during rigor mortis. 3
3. a) What do you know about smoking? Differentiate between hot and cold smoking. 3
b) Discuss the role of smoke in preservation of fish. 4
4. a) Define fish fermentation. Discuss the principles of fermentation of fish. 3
b) Briefly describe the *Shidal* production process in Bangladesh. 4
5. a) Write the basic principles of canning. Discuss briefly the history of fish canning industry. 3
b) Discuss briefly the common problems associated with canned fishery products. 4
6. a) Define fish freezing. Classify different freezing methods commonly employed for fish processing. 3
b) Discuss about the physical and chemical changes in fish during frozen storage. 4
7. a) Distinguish between drying and dehydration of fish. Write down the principles of fish drying. 3
b) Enumerate the nature and extent of blow fly during drying of marine fish. What are the safety measures to control insect infestation in dried fish? 4

Section B

8. a) What is fish salting? Give a scheme for the preparation of dry salted *Hilsa* in Bangladesh. 3
b) Describe the technical problems associated with salting with their preventive measures. 4
9. a) Packaging plays a crucial role to maintain the quality of fishery products-Justify. 3
b) Define MAP. Describe briefly the advantages and disadvantages of MAP for fish products. 4
10. a) Explain the terms: D-value, F-value, and 12D concept. 3
b) Describe briefly the canning process follows in the commercial canning industry. 4
11. a) What do you know about fish freezing curve and thermal arrest time? 3
b) Calculate the amount of heat need to be removed to freeze 12 kg prawn at -40 °C, where the initial temperature is 30 °C. 4
12. a) Define supercooling and crystallization. Which method is more efficient for fish freezing? Why? 3
b) Discuss briefly the effects of drying on quality aspects of fish. 4
13. a) What is modified atmosphere packaging? What factors should you consider to select an ideal packaging material for fishery. 3
b) Discuss the impacts of thaw-rigor, drip loss and gapping in fish processing and preservation. 4
14. Write short notes on any 2 (two) of the followings 3.5 x 2
a) IQF of shrimp; b) Examination of processed fish can and c) *Hilsa* marketing channel.

Chattogram Veterinary and Animal Sciences University, Chattogram
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B. Sc. Fisheries (Hons.) Year -03, Semester-01, Final Examination' 2023

Course code: **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 understand by fish and shellfish? 2
b) How shellfishes are interconnected in the marine ecology and biodiversity? 2
c) "Shellfishes are important in economic, ecology, nutritional and environmental value"- justify. 3
2. a) What do you know about the pallial complex, columella, and torsion in *Pila*? 3
b) Illustrates and describe the male reproductive system of *Pila*. 4
3. a) What do you know about byssus, trochophore, and spat? 2
b) Draw and label the internal anatomy of *Unio*. 2
c) Briefly describe the food and feeding behaviour of *Perna viridis*. 3
4. a) How you will differentiate a prawn from shrimp? 2
b) Illustrates and describe the life cycle of *Macrobrachium rosenbergii*. 5
5. a) What do you mean by mother pearl, blister pearl, and free pearl? 2
b) Describe the pearl formation process with diagram. 5
6. a) Differentiate between male and female crab. 2
b) "Hermit crab is not true crab"- justify the statement. 2
c) Draw the life cycle of *Scylla serrata*. 3
7. Write short note on **any 02 (two)** of the following: 3.5 × 2 =7
a) Moulting and ablation; b) Life cycle of crayfish; and c) Reproduction of *Octopus*

Section-B

8. a) What do you know about thyelycum and petasma? 2
b) Draw and label different developmental stages of *Penaeus monodon*. 3
c) Write down the economic significance of *Penaeus* sp. 2
9. a) Enlist and describe the preferred habitat of Oyster. 2
b) Draw and label the different life cycle stages of Oyster. 2
c) Mention some peculiar behaviour of Oyster. 3
10. a) Point out the key differentiable characters of *Loligo* and *Sepia*. 2
b) Briefly describe the reproductive behaviour of *Sepia* sp. 5
11. a) Explain the factors that affect the age and growth of Clam. 3
b) Briefly describe the shell formation process of Clam. 4
12. a) Diagrammatically show the internal anatomy of crayfish. 2
b) Give an account about the benefits, extent and limitations regarding regeneration in Lobster. 2
c) Summarize the shell formation process of Lobster. 3
13. a) What do you mean by cryptic coloration? 2
b) What do you know about hectocotylus, senescence and brain of *Octopus*? 2
c) Briefly describe the developmental stages of *Octopus*. 3
14. Write short note on **any 02 (two)** of the following: 3.5 × 2 =7
a) Blue blood; b) Environmental and climatic factors on shellfish abundance; and
c) Challenges in shellfish farming

Chattogram Veterinary and Animal Sciences University, Chattogram
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B.Sc. Fisheries (Hons.) Year-03, Semester-01; Final Examination, 2023
Course Code: FPL-301 (T), Course Title: Fish Pathology (Theory)
Full marks: 70; Time: 3 hours

Answer any 05 (five) questions from each section. Figures in the right margin indicate full marks. Use separate answer script for each section.

Section-A

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|----|--|---------|
| 1. | a) Define infection, septicemia, necrosis and disease. | 2 |
| | b) Briefly narrate the degrees of infection. | 3 |
| | c) Why studies on 'Fish Pathology' is important? | 2 |
| 2. | a) Mention five bacterial diseases of fish with their causative agents | 2 |
| | b) Describe MAS and Edwardsiellosis with their etiology, epizootiology, symptoms and Pathology. | 5 |
| 3. | a) Why mollusks are significant in aquaculture? | 1.5 |
| | b) Describe a bacterial disease of oyster and a fungal disease of clam with their etiologies, signs, diagnosis and control measures. | 5.5 |
| 4. | a) What is virus? | 1 |
| | b) Classify fish pathogenic viruses. | 1 |
| | c) Describe two viral diseases of fish with their etiology, symptoms, pathology, diagnosis and distribution. | 5 |
| 5. | a) What is systemic pathology? | 1 |
| | b) Give a list of systemic pathology that can be observed in fish. | 3 |
| | c) Illustrate gill pathology in fish. | 3 |
| 6. | a) Define and classify edema. | 3 |
| | b) Write in brief about cellular degeneration in fish. | 4 |
| 7. | a) Write short notes on any 02 (two) of the following: | 3.5×2=7 |
| | a) Tumor b) Inflammation and c) Fish welfare. | |

Section B

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|-----|--|---------|
| 8. | a) What is stress? | 1 |
| | b) Enumerate the stressors in aquaculture. | 3 |
| | c) Explain the process of transformation stress into diseases. | 3 |
| 9. | a) Illustrate host-pathogen-environment relationship in aquaculture. | 3 |
| | b) Write in brief about some environmental diseases in fish. | 4 |
| 10. | a) What are the most common diseases in shrimp? | 1 |
| | b) Discuss some parasitic diseases of shrimp and prawn. | 6 |
| 11. | a) Give a list of diseases of non-shrimp crustaceans in aquaculture. | 2 |
| | b) Discuss two infectious diseases of non-shrimp crustaceans. | 5 |
| 12. | a) Define shrimp mycosis. | 2 |
| | b) Discuss mycoses of shrimp and shrimp larvae with their health management measures. | 5 |
| 13. | a) Categorize some important non-infectious diseases of fish. | 2 |
| | b) Discuss about six important dietary deficiency diseases of fish with their causes, symptoms, pathology and control measures | 5 |
| 14. | Write short notes on any 02 (two) of the following: | 3.5×2=7 |
| | a) Renal pathology of fish; b) Saprolegniasis and c) Disease diagnosis in aquaculture . | |

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B. Sc. Fisheries (Hons.) Year -03, Semester-01, Final Examination' 2023
Course code: **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 marks. Use separate answer script for each section.

Section-A

1. a) What do you understand by genetics and heredity? 2
b) How does monohybrid cross differ from dihybrid cross? 2
c) Write down the scopes and applications of Genetics in Fisheries and Aquaculture. 3
2. a) Illustrate and describe cell cycle? 3
b) Illustrate the salient events during i) Mitosis metaphase; ii) Mitosis anaphase, iii) Meiosis Pachytene; and iv) Telophase 4
3. a) What do you mean by chromatin, chromatid and chromosome? 2
b) Point out the chemical composition of a eukaryotic chromosome. 2
c) Shortly describe different types of aneuploidy with example. 3
4. a) State the Mendel's law of segregation and why this law is called "law of purity of gametes"? 2
b) Explain the gene action for albinism in Catfish. 5
5. a) Differentiate between X-linked and Y-linked characters and their mode of inheritance. 2
b) Briefly describe an X-linked inheritance in fish. 3
c) Many fish do not have specific sex chromosomes but still show gonochorism. How do you interpret the mechanism? 2
6. a) What do you understand by quantitative phenotype and phenotypic variance? 2
b) Differentiate between V_A and V_D . 2
c) What do you know about epistatic genetic variance? 3
7. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7
a) Scale pattern in common carp; b) Additive gene action; and c) Genetic-environment interaction variance

Section-B

8. a) Compare and contrast between plant and animal cell. 3
b) Write down the structure and function of the cell wall, ribosome, centriole and lysosome. 4
9. a) What do you understand by linkage and crossing-over? 2
b) Enlist the significance of crossing-over in creating genetic diversity. 2
c) Describe different intermolecular recombination with necessary diagram. 3
10. a) Assess the similarities and differences between gene and genotype frequency. 3
b) Narrate the Hardy-Weinberg equilibrium with appropriate example. 4
11. a) What do you understand by dominant, recessive, epistatic and hypostatic gene action? 2
b) Briefly describe the lethal gene action with appropriate example. 5
12. a) What are the six different modifications of classical dihybrid phenotypic ratios observed in fish? 2
Mention the respective gene action for each modified ratio.
b) In dihybrid cross of Mexican Characins, how does the recessive epistasis work for eye colour? 5
Illustrate the F2 generation considering the F1 heterozygous for both loci.
13. a) What do you understand by sex determination and sex differentiation? 2
b) Diagrammatically show the origin of sex organs from mullerian duct. 2
c) Enlist different sex determination system found in fishes with example. 3
14. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7
a) Heritability; b) Multiple allelism; and c) Sex limited traits

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B. Sc. Fisheries (Hons.) Year -03, Semester-01, Final Examination' 2023
Course No: APT 301 (T), Course Title: **Aquatic Pollution and Toxicology (Theory)**
Total Marks: 70, Time: 3 hours

*Answer any **05 (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) Differentiate between pollution and contamination with examples. 2
b) How does eutrophication differ from the harmful algal bloom? 2
c) How eutrophication and harmful algal bloom can be prevented? 3
2. a) Why and how industrial pollution is becoming a serious threat to the inland and marine waters of Bangladesh. 3
b) Formulate your management plan to overcome the industrial pollution of Bangladesh by involving the people, industrialists, and government. 4
3. a) What is ecotoxicology? Enlists the names of common ecotoxicants for the environment. 1+2
b) How toxicity tests can be performed to detect and evaluate the potential impacts of ecotoxicants on aquatic organisms? 4
4. a) What is sludge? Differentiate between sewage and sludge. 1+2
b) Discuss the treatment and purification procedure of sewage containing wastewater with a proper diagram. 4
5. a) Classify plastics based on size, shape, origin, and polymers. 2
b) How does microplastic enter the food chain? 2
c) Discuss the role of microbes in the removal of microplastic from the marine ecosystem. 3
6. a) What is pesticide? List down the major classes of pesticides with examples. 3
b) How do pesticides bioaccumulate and biomagnify in the aquatic environment. 4
7. Write short notes on any 02 (two) the followings: 3.5×2
a) Radioactive pollution; b) Microbial pollution; and c) Thermal pollution.

Section-B

8. a) Differentiate between ballast and bilge water? 1
b) How does ballast and bilge water oil produce serious concerns in the marine environment? 2
c) Discuss the impacts of shipping and shipyards-induced marine pollution in Bangladesh. 4
9. a) What are the natural and human-induced reasons responsible for the anoxic condition of the marine environment? 2
b) Mention the mechanism of dead zone formation in the marine environment 2
c) Discuss how widespread anoxic conditions impacted on the mass extinction of species from the world's ocean. 3
10. a) How can you purify polluted hard water into clean, soft water? 3
b) Discuss how you can purify the chromium containing wastewater discharged from the leather industry. 4
11. a) How do heavy metals bioaccumulate and biomagnify in the marine food chain with reference to Hg? 4
b) Formulate your bioremediation plan to control heavy metal pollution in the marine environment. 3
12. a) What do you know about bio-indicators of water pollution? Mention the essential criteria to be an indicator species for monitoring water pollution. 1+2
b) How the status of pollution of a waterbody can be understood by the presence or absence of bio-indicator species? 4
13. a) Enlists the major environmental policies and legislations available in Bangladesh for controlling aquatic pollution. 2
b) Discuss the major acts, policies, and code of conduct for the prevention and control of marine pollution. 5
14. Write short notes on any 02 (two) the followings: 3.5×2
a) Garbage buying model; b) Aquaculture-induced pollution; and c) Flocculant and flocculation.