

**Chattogram Veterinary and Animal Sciences University, Chattogram**  
**Faculty of Fisheries**  
**B. Sc. Fisheries (Hons.), Year-02, Semester-02 (July-December), Final Examination' 2022**  
**Course No. FMI-202(T), Course Title: Fisheries Microbiology (Theory)**  
**Total Marks: 70, Time: 3 hours**

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

**Section-A**

1. a) What is the significance of microorganisms in nature? Briefly describe the geographical distribution of microorganisms. 4  
 b) Who is the father of modern microbiology? Briefly describe his contribution in the field of microbiology. 3
2. a) Draw and label a typical bacterial cell and write down the functions of its three major structural components. 4  
 b) How bacterial composition of cell wall differentiates the bacterial cells into Gram-positive and Gram-negative? 2  
 c) Write down the importance of cultural characteristics of bacteria in food bacteriology. 1
3. a) Draw a typical mold and show its different parts. 2  
 b) Illustrate common reproductive spores and spore formation of the "fungi imperfectii". 5
4. a) Define bacterial growth curve. During which phase of growth bacterial cell division is maximum? 2  
 b) How do redox-potential values of food indicate aerobic, anaerobic and microaerophilic environments? 3  
 c) What are the factors responsible for the decline of microbial growth at temperature below optimum for growth? 2
5. a) Compare aquatic and terrestrial bacteria. Give generic name of 5 (five) marine bacteria. 3  
 b) "Aquatic microbes play important role in the Fisheries science"-explain. 4
6. a) How can you define a virus with examples? Draw and label different types of viral structures. 4  
 b) Mention the host range of viruses. Why viruses are called obligate parasites? 3
7. a) What is capsid and envelop of a virion? Explain whether viruses are living or nonliving. 4  
 b) Classify viruses according to Baltimore with example. 3

**Section-B**

8. a) What is contamination and spoilage? Write down post-harvest sources of fish contamination. 4  
 b) Briefly describe the factors influencing the kinds and rate of fish spoilage. 3
9. a) What is antigen? Give examples of some substances which can act as antigens. 2  
 b) What is immunity? Which matters are essential for the immune response of the body? 3  
 c) How do chemical disinfectants kill microorganisms? 2
10. a) What is Salmonellosis? Give an account of the microorganisms involved in different types of food infection and intoxication. 3  
 b) What are the conditions necessary for an outbreak of Salmonellosis? What are the preventive measures? Write the factors affecting the heat resistance of microorganisms? 4
11. a) What type of qualitative changes is expected to occur in bacterial population in fish preserved at low temperature? Differentiate between spoilage and quality deterioration of fish. 4  
 b) What is putrefaction? Write the types of the anaerobic fermentation of glucose. 3
12. a) Define pathogenic bacteria. Which pathogens are more frequently found in polluted water? 2  
 b) Describe the influence of temperature and salinity on the growth and activity of microorganisms. 3  
 c) What are the post-harvest sources of contamination of fish? Write the causes of spoilage in fish. 2
13. a) What is the function of flagella? How can you classify bacteria based on arrangements of flagella on the surface of the bacterial cell? 4  
 b) What is Mycoplasma? Why bacterial spores are more highly heat resistant than vegetative cell? 3
14. Write down short notes any TWO of the following: 3.5×2=7  
 a) Botulism; b) Economic importance of aquatic microorganisms; and c) Microbial changes in nitrogenous compounds in fish



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

**B. Sc. Fisheries (Hons.), Year-02, Semester-02 (July-December), Final Examination' 2022**  
**Course No. FPA-202(T), Course Title: Fish Parasitology (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 is parasite? 3.0  
b) Enumerate parasitic groups of fishes with their distinguishing characteristics. 4.0
2. a) Categorize major groups of fish parasites of Bangladesh with examples. 2.5  
b) Briefly describe the morphological characters of an ecto-parasitic fluke and a hermaphroditic endo-parasitic worm of fish with examples and labelled diagram. 4.5
3. a) Define prevalence, mean intensity and relative abundance. Do you have any idea about infrapopulation and suprapopulation? 4.5  
b) Explain the relationship among host-parasite-environment. 2.5
4. a) Why it is important to know the life cycles of fish parasites? 2.0  
b) Illustrate the life cycle of a digenetic trematode of fish. 5.0
5. a) Enlist some crustacean parasitic diseases of fish with their etiology. 2.0  
b) Discuss the disease caused by "fish louse" in fish with their control measures. 5.0
6. a) Which fish species are more susceptible to "gill fluke"? 2.0  
b) Write in brief about "gill fluke" infestation in fish. 5.0
7. Write short notes on **any 2 (two)** of the following: 3.5×2=7.0  
a) Life cycle of *Ichthyophthirius multifiliis*; b) Pseudo parasitism and c) Host specificity

**Section B**

8. a) What is Hyperparasitism? 2.0  
b) Discuss parasites as biological tags. 5.0
9. a) Enlist some protozoan and acanthocephalan fish parasites. 2.0  
b) Illustrate the life cycle of an acanthocephalid worm. 5.0
10. a) Differentiate between accidental parasitism and obligate parasitism. 2.0  
b) Write in brief about different types of symbiosis. 5.0
11. a) Differentiate definitive host and intermediate host. 2.0  
b) Discuss briefly the causative agent, life cycle, clinical signs, prevention and control of a disease caused by 'spiny-headed worm'. 5.0
12. a) Define zoonosis. Name five fish borne parasitic zoonosis with causative agents. 2.0  
b) Describe fish borne parasitic cestodiasis with causative agents, clinical signs, and preventive measures. 5.0
13. a) Enumerate the factors influencing parasite fauna in fish. 2.0  
b) Discuss "Anchor worm" infestation in fish. 5.0
14. Write short notes on **any 2 (two)** of the following: 3.5×2=7.0  
a) Reservoir host; b) Ichtyobodosis and c) Parasymbiosis



**Chattogram Veterinary and Animal Sciences University, Chattogram**  
**Faculty of Fisheries**  
**B. Sc. Fisheries (Hons.), Year -02 Semester-02, Final Examination' 2022**  
**Course No: CZM-202 (T); Course Title: Coastal Zone Management (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) Define and mention the purposes of Coastal Zone Management. 3.0  
b) Sketch and briefly describe the geomorphological structure of the coastal and marine environment of Bangladesh. 4.0
2. a) What do you mean by "coastal eco-engineering"? 2.0  
b) Briefly describe the eco-engineering of coastal environment through saltmarsh restoration in Bangladesh. 5.0
3. a) What is a maritime jurisdiction? Briefly discuss Bangladesh's maritime jurisdictions for the Territorial Sea and EEZ. 4.0  
b) Formulate a plan and recommendation for the restoration of Chakaria Mangrove Forest of Bangladesh. 3.0
4. a) What are the multiple uses of coastal zones? 2.0  
b) Draw a layout of a typical salt pan with duration and salinity changes, and briefly describe the salt production technique practiced in coastal areas of Bangladesh. 5.0
5. a) Classify coastal management plans. 2.0  
b) Design a strategy management cycle for coastal zone management. 2.0  
c) Discuss the seven-tier management of the coastal zone. 3.0
6. a) Briefly mention the major steps in coastal management plan formulation. 2.0  
b) Discuss the major components of coastal management plan implementation. 5.0
7. Write short notes on any 02 (Two) of the following 3.5×2= 7.0  
a) Coastal aquaculture;                      b) Coastal Zone policy' 2005 and                      c) Coastal vulnerability.

**Section-B**

8. a) What is the importance of ICZM? 2.5  
b) Write down the main tools of ICZM. Enlist the management issues for sustainable ICZM. 4.5
9. a) What do you mean by coastal resilience? 1.5  
b) "Strong economy and powerful management are the prime factors of coastal resilience"- do you agree with that statement and why? 2.5  
c) Discuss the gaps and challenges of Bangladesh policies and institutional framework. 3.0
10. a) "Environmental impact assessment is considered as a prime task of management program"- justify. 3.0  
b) Briefly describe an environment impact assessment model on the basis of coastal zone management. 4.0
11. a) What do you mean by restoration? 1.5  
b) Discuss the importance of GIS in designing a sustainable coastal zone planning and management. 2.5  
c) Enumerate the issues related to biodiversity loss in the coastal zone of Bangladesh. 3.0
12. a) Compare vulnerability and threats. 1.5  
b) "Vulnerability indicators composing the vulnerability index influence the lifestyle of coastal communities"- justify the statement. 2.5  
c) Illustrate the vulnerability management life cycle. 3.0
13. a) Explain the coastal zone by sketching coastal morphology. 3.0  
b) Discuss the importance of zoning for sustainable coastal resource management in Bangladesh. 4.0
14. Write short notes on any 02 (Two) of the following: 3.5×2= 7.0  
a) ICZM framework;                      b) Disaster management model and                      c) Estuarine biodiversity.



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

**B. Sc. Fisheries (Hons.), Year -02 Semester-02 (July-December), Final Examination' 2022**

**Course No: FOC-202 (T), Course Title: Fisheries Oceanography (Theory)**

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

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

**Section A**

1. a) How geological layers of the earth vary in characteristics and composition? 3  
b) What are the discontinuities inside the earth geological layers? 2  
c) Differentiate between the oceanic and continental crust. 2
2. a) What is sea bottom topography? Classify sea mountains with necessary illustrations. 4  
b) Draw and describe the features of the continental margin. 3
3. a) Define sediment. Explain and classify biogenous and authigenous sediment. 4  
b) How sediments sort and distribute over the ocean floor? 3
4. a) What are the tide-producing forces? Briefly explain. 3  
b) How tidal heights vary with earth-moon-sun position? 4
5. a) How the land pattern "spit" forms along the coastline? 3  
b) Illustrate the upwelling and downwelling mechanism in the ocean in brief. 4
6. a) Illustrate constancy of composition in seawater. 3  
b) Define the T-S diagram? Sketch a typical vertical distribution profile of salinity and temperature in the ocean. 4
7. Write short notes on **any two (02)** of the following: 3.5×2= 7  
a) Tsunami; b) Bioturbation and c) Thermohaline circulation

**Section B**

8. a) What is earth plate? Classify earth plate boundaries. 4  
b) Illustrate and explain the mechanism responsible for plate boundary movement. 3
9. a) Describe the arrangement patterns of marine sediment. 3  
b) Mention the particle size of the sediments. 2  
c) What are the sources of sediment? 2
10. a) Draw and write down the properties of a wave? 2  
b) Differentiate between constructive and destructive wave? 2  
c) Explain the mechanism of wave movement towards the shore. 3
11. a) Describe how the *El-nino* and *La-nina* events impact world climatic condition. 4  
b) What is a Gyre? What factors cause the horizontal movement of sea water? 3
12. a) What is the total maritime boundary of Bangladesh? 1  
b) Describe the features of the SoNG in the Bay of Bengal (BoB). 3  
c) Illustrate the main features of the Bengal Fan. 3
13. a) What is Ninety East Ridge? 1  
b) What do you know about Ekman spiral and Coriolis effect in ocean circulation? 3  
c) Classify marine pelagic habitat with diagram. 3
14. Write short notes on **any two (02)** of the following: 3.5×2= 7  
a) Origin of the world oceans; b) Gulf stream and c) Continental drift theory



**Chattogram Veterinary and Animal Sciences University, Chattogram**  
**Faculty of Fisheries**  
**B. Sc. Fisheries (Hons.) Year -02, Semester-02, Final Examination' 2022**  
**Course No: FPH-202 (T), Course Title: Fish Physiology (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 fish physiology and anatomy? 2  
b) Enlist the major physiological systems found in fishes. 2  
c) Write down the importance of studying fish physiology for the modern aquaculture. 3
2. a) Briefly explain the secretion and function of bile and bile salts in fish. 2  
b) Briefly describe the carbohydrate digestion process in fish. 5
3. a) What do you know about SDA? 3  
b) What specific metabolic pathways, enzymes and gene expression modulate energy utilization? 4
4. a) Enumerate the Fick's law of diffusion. 3  
b) Explain the gas exchange mechanism in teleost with diagram. 4
5. a) Explain the following terms with example: osmoregulation, osmosis, homeostasis, hypertonic solution, stenohaline and osmoconformers. 3  
b) Briefly describe the osmoregulation mechanism of diadromous fish. 4
6. a) What do you know about gonadal maturation? 2  
b) Explain different types of fish reproductive behaviour with example from each type. 5
- 7 Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7  
a) Antifreeze proteins, b) Pacemaker, c) Bohr effect, and d) Chloride cell

**Section-B**

8. a) What is thermal regulation and  $Q_{10}$ ? 3  
b) Summarize the thermal regulation process in endothermic fish. 4
9. a) What do you understand by digestion and absorption? 2  
b) "Herbivore and detritivore fishes have longer intestines than carnivore"- explain. 2  
c) Diagrammatically show the digestive apparatus of different groups of fish. 3
10. a) Differentiate between general and microcirculation of blood. 2  
b) Diagrammatically show the circulatory mechanisms of fish and amphibian. 5
11. a) What do you mean by respiration and respiratory volume? 2  
b) Describe the transportation of oxygen in fish. 5
12. a) Enlist the excretory organs in different animal groups. 2  
b) Write down the use of excretory products. 2  
c) What are different types of kidneys found in fishes? Draw and label each of them. 3
13. a) What do you mean by reproduction and reproductive cycle? 2  
b) Illustrate and explain the HPG axis in vertebrates. 5
14. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7  
a) Zymogen, b) Factors controlling metabolism in fish, c) Glomerulus, and d) Pheromone



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

**B. Sc. Fisheries (Hons.), Year-02, Semester-02 (July-December), Final Examination' 2022**  
**Course No.: FPD-202(T), Course Title: Fish Population Dynamics (Theory)**  
**Total Marks: 70, Time: 3 hours**

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

**Section-A**

1. a) Define species, population and fish population dynamics. 3  
b) Why do you study fish population dynamics? 2  
c) How are the numbers of individuals in a stock controlled? 2
2. a) Shahida conducted marking experiments on Rohu fish in the Kaptai lake. In that experiment, 984 fish were tagged and released. After fishing, 3253 fish were caught of which 68 had tags. Make an estimate of absolute abundance of Rohu fish in the Kaptai lake. [  $t=1.96$  ] 5  
b) Write down the assumptions of mark-recapture method. 2
3. a) Distinguish between group marking and individual marking. 2  
b) Enlist four internal and four external tags. 2  
c) What are the points will you consider while going to select tag for marking fish? 3
4. a) What does the correlation coefficient and coefficient of determination express about two variables in linear relationship? 3  
b) Show algebraically how to transform the equation of logistic curve into a straight line equation. 4
5. a) Define  $L_m$ . Why do you adjust the proportion of sexual mature individual to estimate  $L_m$ ? 3  
b) Describe the different method used to estimate fecundity of a mature female individual. 4
6. a) Illustrate the reason for fish death during planktonic larval stage. 3  
b) Describe the sources of errors in mortality estimation based on CPUE data. 3  
c) Write down the Pauly's equation to estimate natural mortality. 1
7. a) Define recruitment. Mention three models with equations used to express stock-recruitment relationship of fish. 4  
b) What is the difference between growth overfishing and recruitment overfishing? 3

**Section-B**

8. a) Define MSY. 2  
b) Elaborate concept of maximum sustainable yield in surplus yield models with necessary figures. 5
9. a) Describe the advantages of fishery-dependent data over fishery-independent data. 2  
b) The numbers of sea cucumber of seven quadrates sampled from a habitat of 16500 m<sup>2</sup> area were 5, 11, 7, 16, 8, 10 and 3. All the quadrates area is equal size of 100 m<sup>2</sup>. Calculate the absolute abundance of population with 95% confidence level. [  $t=2.45$  ] 5
10. a) Define selectivity of fishing gear. Illustrate graphically mesh selectivity curves for trawl nets for both smaller and larger mesh sizes. 4  
b) Mention the advantages of length measurement for recording the size of marine species. 3



11. a) Enlist 5 hard parts of fish. 2  
 b) An experiment involving covering the cod end of a trawl net with a cover made of smaller mesh netting produced the following small sample. Make an initial estimate of the mean length at first capture ( $L_c$ ). 5

Length (cm)	Cover	Cod end
10	2	0
11	24	3
12	27	8
13	26	11
14	35	26
15	22	47
16	12	72
17	5	67
18	0	48

12. a) Define absolute growth and relative growth of fishes. Write down the equations of any three growth models of fish in terms of length and weight. 4  
 b) Convert the logistic equation of length-weight relationship to its linear form. 3
13. a) Differentiate between annual fecundity and annual potential fecundity. 2  
 b) "Only female ovaries are studied in fisheries work"- Describe reason behind this. 3  
 c) Mention the different method used to determine spawning season. 2
14. a) Define catch curve. 2  
 b) Compare and contrast between age-based catch curve and length-based catch curve. 5



**Chattogram Veterinary and Animal Sciences University, Chattogram**  
**Faculty of Fisheries**  
**B. Sc. Fisheries (Hons.), Year-02, Semester-02 Final Examination' 2022**  
**Course No. FEC-202 (T), Course Title: Fisheries Economics (Theory)**  
**Total Marks: 70, Time: 3 hours**

*Answer any 3 (three) questions from each section where question no. 2 and 5 are mandatory. Use separate answer script for each section. Figures in the right margin indicate full mark.*

**Section-A**

1. a) Briefly discuss the three basic questions of economics. Provide a brief overview on fundamental knowledge and features of fisheries economics. 6.0  
b) Explain basic models of bio-economics of fisheries. How will you evaluate sustainable use of fisheries resources? 6.0
2. a) How will you start carp fish farming in your area? Write your opinion according to your theoretical knowledge. 6.0  
b) Discuss the economic importance of fish farming in Bangladesh. 5.0
3. a) Define project and discuss the discounted project appraisal tools with their advantages and disadvantages. 7.0  
b) Explain the functions of money. 5.0
4. a) What do you mean by "willingness to pay" and "willingness to accept"? Are they all equal? 6.0  
b) Define the price elasticity of demand. If demand is elastic, how will an increase in price change total revenue? Explain. What do we call a good which income elasticity is less than 0? 6.0

**Section-B**

5. a) Explain the law of variable proportions. 6.0  
b) Which stage of a rational producer will seek to his production? 5.0
6. a) What are the basic steps in fisheries stock assessment? Nominate what you believe to be the most important five of these steps. Why? 6.0  
b) How does overfishing affect ocean biodiversity? How can we prevent overfishing and its related problems in our oceans? 6.0
7. a) Discuss the relationship between average cost (AC) and marginal cost (MC) with the help of a diagram. 7.0  
b) How does environment influence fish production in our country? 5.0
8. Write short notes on: 4 × 3 = 12
  - a) Marginal Rate of Substitution (MRS)
  - b) Total Allowable Catches (TACs) versus Individual Transferable Quotas (ITQs) and
  - c) Function of commercial bank