

**ing Veterinary & Animal Sciences University, Chittagong  
Faculty of Fisheries**

**eries (Hons.) Year-03, Semester-1 (January – June), Final Examination, 2015  
Course Code: APT 301(T); Course Title: Aquatic Pollution & Toxicology  
Total Marks: 70; Time: 3 hour**

*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 is marine pollution? 2  
b) Briefly explain the major sources of land based and sea based pollutants in the Bay of Bengal. 3  
c) Write down the impacts of sea based pollution. 2
2. a) What do you mean by conservative elements? 2  
b) Describe hydrologic cycle of the ocean with schematic conceptualization. 5
3. a) What is sewage and sludge matter? 3  
b) Describe shortly the biological and physical steps of sewage treatment procedures with flow diagram. 4
4. a) What do you mean by "Redox equilibrium in natural waters"? 2  
b) What does Redfield Ratio means? 2  
c) Illustrate the vertical stratification in ocean environment with diagram. 3
5. a) What are the potential threats of oil spillage in Bangladesh? 3  
b) Describe at least two techniques for the removal of oil from ocean surface. 4
6. a) Why concentration of CO<sub>2</sub> is lower in surface ocean? 2  
b) What are the major sources of CO<sub>2</sub> in aquatic environment? 2  
c) Illustrate the CO<sub>2</sub> system in marine environment with their circulation and transformation. 3
7. Write short notes on any two of the followings: 3.5×2 7  
a) Ocean acidification b) POPs c) Global warming d) Ecological indicators

**Section: B**

8. a) Specify physical and chemical characteristics of sewage. 2  
b) "Sewage pollution is a great barrier in waterbody"- explain the statement. 2  
c) Describe the major causes and remedial measures of sewage pollution. 3
9. a) What do you mean by dead zones? 1  
b) Sketch the oceanic thermal profile. 3  
c) Briefly discuss the eutrophication process. 3
10. a) Define Biomagnification. 2  
b) Show the pathway of biological amplification of pesticide in oceanic condition. 5
11. a) What are the major types of industrial pollution? 2  
b) Discuss the ecological and biological impacts of industrial pollution. 2  
c) Illustrate the environmental transport and transformation of PCB in marine and coastal environments. 3
12. a) Discuss the different types of coastal pollution. 2  
b) What are the causes and effects of coastal pollution due to point and nonpoint pollution sources.
13. a) What is pollutant? Discuss different types of pollutants. 4  
b) How can pollutants affect food chains and ecosystem? 3
14. Differentiate between two factors (any two of the followings):  
a) Contaminants and contamination; b) Bioaccumulation and biomagnification;  
c) Sewage and sludge; d) Point and nonpoint pollutants.

Chittagong Veterinary and Animal Sciences University, Chittagong  
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year -03 Semester-01 Final Examination' 2015  
Course No & Title: FPI-301 (T), Fish Pathology and Immunology (Theory)  
Full Marks: 70, Time: 3 hours

Answer any 05 (five) questions from each section. The figures in the margin indicate full mark.

Section-A

1. a. Define pathology and disease. 2  
b. Write down different stages of infection? 3  
c. Mention the factors producing disease in fishes. 2
2. a. What is edema and septicemia? 2  
b. Briefly describe the different types of edema in fishes. 2  
c. Write down the mechanism of cell development and death in fishes. 3
3. a. Define systemic pathology. 2  
b. Describe digestive and renal pathology in fishes. 5
4. a. What is immunoglobulin? 2  
b. Draw and level a typical immunoglobulin molecule with its function in fishes. 2  
c. Describe the mechanism of immunoglobulin production in fish. 3
5. a. What is immunity? 2  
b. Differentiate between specific and non-specific immunity. 2  
c. Briefly discuss the humoral factors of non-specific immune response. 3
6. a. Define immunostimulants and immunomodulators. 2  
b. Give a list of immunostimulants used in aquaculture with their mode of action. 5
7. Write notes on any **two** of the followings: 3.5X2=7
  - a. Integumentary pathology
  - b. Strain virulence
  - c. Immunodiagnostic methods in fish

Section B

8. a. Define drug, medicine and probiotic. 2  
b. Mention the criteria for selection of drug. 2  
c. Give an account of uses of common drugs against disease with their mode of action in Bangladesh aquaculture. 3
9. a. Name the major bacterial diseases with their causative agents of fishes. 3  
b. Describe any two of the major bacterial diseases with their clinical signs, pathology, epizootiology and control measures. 4
10. a. What is EUS? 2  
b. What is the etiological agent of EUS? 1  
c. Describe the distribution, symptom, pathology and diagnosis of EUS. 4
11. a. What is hybridoma technology? 2  
b. What are the advantages of monoclonal antibody over polyclonal antibody? 2  
c. Write down the procedures for the preparation of monoclonal antibody. 3
12. a. What do you mean by blood serum, immune serum and active serum? 2  
b. Define phagocyte and phagocytosis. 2  
c. Briefly describe about the process of phagocytosis. 3
13. a. Define active and passive immunization. 2  
b. Write down the names and causative agents of diseases regarding availability of vaccines in aquaculture. 3  
c. What are the prospects of vaccination in Bangladesh aquaculture? 2
14. Write notes on any **two** of the followings: 3.5X2=7
  - a. Lymphoid organs
  - b. ELISA
  - c. Cell mediated immunity

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**Faculty of Fisheries**

B. Sc. Fisheries (Hons.) Year -03 Semester-01 Final Examination' 2015  
Course No & Title: CCF-301 (T), Climate Change & Fisheries (Theory)  
Full Marks: 70, Time: 3 hours

*Answer any 05 (five) questions from each section. The figures in the margin indicate full mark.*

**Section-A**

- |    |    |   |     |
|----|----|---|-----|
| 1. | a. | Define climate and climate change.  | 2.0 |
|    | b. | Discuss the impacts of climate change on aquatic ecosystem.   | 5.0 |
| 2. | a. | What do you mean by stratification?   | 2.0 |
|    | b. | Discuss the effects of ocean circulation and coastal upwelling from climate change point of view.               | 5.0 |
| 3. | a. | What do you know about the role of anthropogenic activities on climate change?                                  | 2.0 |
|    | b. | What is greenhouse effect? "Current global warming trend is human exemption of the greenhouse effect" –Justify. | 5.0 |
| 4. | a. | "Unusual weather events may accelerate disease outbreaks"-explain.  | 2.0 |
|    | b. | How does climate change affects the physiology of fish?   | 5.0 |
| 5. | a. | What is climate vulnerability?  | 2.0 |
|    | b. | "Climate vulnerability is globally and socially differentiated"-discuss briefly.                                | 5.0 |
| 6. | a. | What are the present scenario of climate change in respect to temperature and rainfall changing in Bangladesh?  | 3.0 |
|    | b. | Describe the impacts of sea level changes and salinity intrusion in Bangladesh.                                 | 4.0 |
| 7. | a. | What are the probable effects of changes in monsoonal pattern?  | 2.0 |
|    | b. | Discuss the global warming and temperature increase associated impacts of inland aquaculture.                   | 5.0 |

**Section B**

- |     |    |   |     |
|-----|----|---|-----|
| 8.  | a. | Write a short note on the reasons behind extreme vulnerability of Bangladesh to climate change.   | 2.0 |
|     | b. | Write down the potential effects on human due to climate change in Bangladesh.  | 5.0 |
| 9.  | a. | Write down the steps of mitigation of risks of climate change. What would be your inference on adaptation to climate change for fisheries sector? | 2.0 |
|     | b. | Discuss the probable impacts and recommendation of increased temperature and drought on fisheries sector.   | 5.0 |
| 10. | a. | Write down the effects of ocean acidification.  | 2.0 |
|     | b. | Discuss the effects of climate change on fish spawning and recruitment process.   | 5.0 |
| 11. | a. | What are the potential positive impacts of climate change on fisheries sector?  | 2.0 |
|     | b. | How small scale and artisanal marine fisheries sector is being affected by unusual climate events?  | 5.0 |
| 12. | a. | What do you know about food fish needs?   | 2.0 |
|     | b. | Discuss potential changes in aquaculture production under different climate change scenario.  | 5.0 |
| 13. | a. | Write a short note on "Montreal protocol".  | 2.0 |
|     | b. | Briefly discuss the climate change impacts on biodiversity.   | 5.0 |
| 14. | a. | Write a short note on "Kyoto protocol".   | 2.0 |
|     | b. | What would be your inference on indirect impacts of climate change on aquaculture?  | 5.0 |

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

B. Sc. Fisheries (Hons.) Year -02 Semester-01 Final Examination' 2015

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

Total Marks: 70, Time: 3 hours

*Answer any 05 (five) questions from each section. The figures in the margin indicate full mark.*

**Section-A**

- |    |    |  |           |
|----|----|--|-----------|
| 1. | a. | Define shellfish.  | 2.0       |
|    | b. | Distinguish between finfish and shellfish.                               | 3.0       |
|    | c. | Why will you study shellfish biology?                                    | 2.0       |
| 2. | a. | Enlist the shellfish species found in Bangladesh.                        | 2.0       |
|    | b. | Write down the economic significance of crustaceans.                     | 5.0       |
| 3. | a. | What do you mean by habitat?   | 2.0       |
|    | b. | What types of habitat is needed for the sustenance of shellfish species? | 5.0       |
| 4. | a. | What do you know about the morphology of clam?                           | 2.0       |
|    | b. | Briefly describe the reproduction procedure of clam.                     | 5.0       |
| 5. | a. | Distinguish a freshwater giant prawn from a marine tiger shrimp.         | 3.0       |
|    | b. | Draw a diagram of shrimp or prawn and label its different parts.         | 4.0       |
| 6. | a. | Briefly describe the life cycle of <i>Octopus</i> .                      | 4.0       |
|    | b. | Draw and label the internal anatomy of atypical mollusks.                | 3.0       |
| 7. |    | Write short on (any two) from the following:                             | 3.5×2=7.0 |
|    | a. | Glochidium   |           |
|    | b. | Hypobranchial gland  |           |
|    | c. | Economic importance of Oyster  |           |

**Section B**

- |     |    |   |     |
|-----|----|---|-----|
| 8.  | a. | What do you know about the shell formation in Oyster?                           | 3.0 |
|     | b. | Enlist some commercially important Oyster species in Bangladesh.                | 2.0 |
|     | c. | Diagrammatically show the life cycle of oyster.                                 | 2.0 |
| 9.  | a. | What do you know about the female reproduction system of <i>Pila</i> ?          | 4.0 |
|     | b. | Briefly describe the fertilization and development of <i>Pila</i> .             | 3.0 |
| 10. | a. | Write down the ecological importance of Crayfish.                               | 2.0 |
|     | b. | Compare and contrast the external morphology of Crayfish and Lobster.           | 4.0 |
|     | c. | Mention the development stages of Crayfish.                                     | 1.0 |
| 11. |    | Briefly describe the life history of <i>Peaneus monodon</i> .                   | 7.0 |
| 12. | a. | Distinguish between male and female Prawn.                                      | 2.0 |
|     | b. | Briefly describe about the reproduction procedure of Prawn with diagram.        | 5.0 |
| 13. | a. | Enlist the physical factors that affect the shellfish health.                   | 2.0 |
|     | b. | Briefly describe the chemical factors in shellfish population.                  | 5.0 |
| 14. | a. | Define biodiversity.  | 2.0 |
|     | b. | What are the techniques you will follow to control biodiversity of shellfishes? | 5.0 |

**Chittagong Veterinary and Animal Sciences University, Chittagong**

**Faculty of Fisheries**

B. Sc. Fisheries (Hons.) Year -03 Semester-01 Final Examination' 2015

Course No & Title: **IFM-301 (T), Inland Fisheries Management (Theory)**

Full Marks: 70, Time: 3 hours

Answer any 05 (five) questions from each section. The figures in the margin indicate full mark.

**Section-A**

- |    |    |  |     |
|----|----|--|-----|
| 1. | a. | What do you mean by Fisheries Management?                                      | 1.0 |
|    | b. | Write down the objectives of Fisheries Management.                             | 2.0 |
|    | c. | What are the challenges of managing inland fisheries?                          | 4.0 |
| 2. | a. | Define fisheries regulation.   | 1.0 |
|    | b. | Write down the purposes of fisheries regulation.                               | 2.0 |
|    | c. | Briefly describe different types of fisheries regulation.                      | 4.0 |
| 3. | a. | What do you mean by habitat restoration?                                       | 1.0 |
|    | b. | What do you mean by fish pass and fish screen?                                 | 2.0 |
|    | c. | Write down the different habitat improvement techniques of lotic waterbodies.  | 4.0 |
| 4. | a. | What do you mean by fisheries cooperative?                                     | 1.0 |
|    | b. | What are the objectives of fisheries cooperative?                              | 2.0 |
|    | c. | What does CBO need to be a successful and sustainable organization?            | 4.0 |
| 5. | a. | What do you mean by life history pattern?                                      | 1.0 |
|    | b. | Write down the important life history features required for Hilsa management.  | 2.0 |
|    | c. | What are the challenges of managing Hilsa fisheries in Bangladesh?             | 4.0 |
| 6. | a. | What do you mean by recreational fisheries?                                    | 1.0 |
|    | b. | What types of conflicts found in recreational fisheries?                       | 2.0 |
|    | c. | Briefly describe the different processes of recreational fisheries management. | 4.0 |
| 7. | a. | What do you mean by sustainability?  | 1.0 |
|    | b. | What are the principles for managing fisheries sustainability?                 | 2.0 |
|    | c. | What are the sustainability challenges in fisheries management?                | 4.0 |

**Section B**

- |     |    |   |     |
|-----|----|---|-----|
| 8.  | a. | What do you mean by inland waterbody?   | 1.0 |
|     | b. | Why is inland fisheries management so important for Bangladesh?                           | 2.0 |
|     | c. | Write down the multipurpose use of inland waterbodies.                                    | 4.0 |
| 9.  | a. | What are the basic requirements of a fish way?  | 2.0 |
|     | b. | What are the purposes of fish screen?   | 2.0 |
|     | c. | Write down the general types of fish ways.  | 3.0 |
| 10. | a. | Write down the importance of fisheries cooperative.                                       | 2.0 |
|     | b. | How does fisheries cooperative help in fisheries management?                              | 2.0 |
|     | c. | Write down the government policy for the managing <i>Khas</i> waterbodies in Bangladesh.  | 3.0 |
| 11. | a. | Show the major spawning grounds of Hilsa in the map of Bangladesh.                        | 2.0 |
|     | b. | List down the sanctuaries of Hilsa in Bangladesh.   | 2.0 |
|     | c. | Why is Hilsa fisheries management so important in Bangladesh?                             | 3.0 |
| 12. | a. | Write down the general principles of recreational fisheries management.                   | 2.0 |
|     | b. | Write down the different conservation issues, might facing during recreational fisheries. | 2.0 |
|     | c. | What are the factors to run a successful cooperative?                                     | 3.0 |
| 13. | a. | What do you mean by sustainable livelihood approach for fisheries management?             | 2.0 |
|     | b. | What are the key indicators to assess the achievement of sustainable livelihoods?         | 2.0 |
|     | c. | Briefly describe the sustainable livelihood framework for managing fisheries.             | 3.0 |
| 14. | a. | What do you mean by ecosystem approach for fisheries management?                          | 2.0 |
|     | b. | Write down the principles of ecosystem approach to fisheries.                             | 2.0 |
|     | c. | What are the elements needed for successful ecosystem management?                         | 2.0 |

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B. Sc. Fisheries (Hons.) Year -03, Semester-01, Final Examination' 2015

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

Total Marks: 70, Time: 3 hour

Answer any 04 (four) question from each section where question 1 (one) and 6 (six) are compulsory.

Figure in the right margins indicates full marks.

Section-A

1. a. Define rural sociology? 02  
b. What is the importance of rural sociology in the field of fisheries? 02  
c. Briefly discuss different kinds of fisheries resources in Bangladesh. 04
2. Define culture. "Culture indicates both material and non-material elements"- Critically examine the statement citing example from any fishing community of Bangladesh. 09
3. a. Define sustainable livelihood. 02  
b. What are the objectives of sustainable livelihood? 02  
c. Discuss the livelihood assets. Explain the vulnerability context of the fishermen livelihood of Bangladesh. 05
4. What do you mean by sustainable development? Suggests strategies for sustainable development of the fishing community of Bangladesh. 09
5. What is migration? "Migration of the community from rural to urban areas indicates both horizontal and vertical mobilities"- Discuss with suitable example. 09

Section-B

6. a. What is meant by social survey? Distinguish between structured and non-structured questionnaire. 03  
b. Briefly discuss the steps for conducting a social research. 05
7. a. Define food chain. Briefly discuss the energy transformation process in context of Bangladesh. 06  
b. What are the main factors of human development? 03
8. a. Define social change. 03  
b. Enumerate the various factors which cause of social change. 06
9. Explain with example, how geographical factors influence life patterns of the rural people? 09
10. Identify the differentiating factors between rural and urban community of Bangladesh. 09

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B. Sc. Fisheries (Hons.) Year-03, Semester-1 (January – June), Final Examination, 2015

Course Code: JOA- 301(T); Course Title: Integrated and Organic Aquafarming

Total Marks: 70; Time: 3 hour

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 is integrated aquafarming? 2  
b) Explain the importance of integrated aquafarming in current context of Bangladesh. 5
2. a) Describe briefly complex and multi-component integrated systems. 2  
b) Write notes on any two of the following categories of complex integrated systems: 2.5x 2=5  
i) Plant → animal → fish; ii) animal → animal → fish; iii) waste → fish → plant
3. a) What is aquaponics? 2  
b) Describe the principles of aquaponics. 2  
c) Write down the advantages and disadvantages of aquaponics. 3
4. a) Sketch and briefly describe the energy flow of integrated rice-fish farming 4  
b) Describe the mutual benefits of rice and fish in integrated system with scientific evidences. 3
5. a) Differentiate among various types of origin of wastes in fish ponds. 2  
b) Describe the impacts of waste-loading on environmental qualities in lentic habitat. 5
6. a) Distinguish between conventional and organic aquafarming. 2  
b) What are the scopes of organic aquaculture in Bangladesh? 5
7. Write short note on any 2(two) of the followings: 3.5x2=7  
a) Autotrophic pathway of waste utilization  
b) Environmental Impact Assessment (EIA)  
c) Nutrient Film Technique (NFT)

Section: B

8. a) Make a list of fishes recorded as having been or being farmed in rice fields with its common and scientific name. 3  
b) Give a comparison between environmental requirements of fish and rice. 4
9. a) Briefly describe the main types of aquaponics system. 3  
b) Explain the main factors for a successful system of aquaponics. 4
10. a) Explain the seasonality of rice-fish farming in Bangladesh in relation to fish culture. 2  
b) Describe the steps to be adopted for rice-fish culture with special reference to Asian countries. 5
11. a) What are the advantages of integrated fish-horticulture farming? 3  
b) Justify the importance of integrated fish-horticulture farming in terms of seasonality. 4
12. a) What do you know about organic aquaculture certification? 2  
b) Enumerate the general principles concerning organic aquaculture production according to IFOAM. 5
13. a) What are the constraints and opportunities of integrated aquaculture in terms of stakeholder participations? 4  
b) How the government can provide support for the development of integrated aquafarming? 3
14. Write short notes on any 2 (two) of the followings: 3.5x2=7  
a) Organic aquaculture  
b) Aquaculture waste management  
c) IFCAS

Chittagong Veterinary & Animal Sciences University, Chittagong  
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B. Sc. Fisheries (Hons.) Year-3, Semester-1 (January – June), Final Examination, 2015

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

Full Marks: 70; Time: 3 hour

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) Write down the general principles of fish processing. Name the rapid and effective methods of fish processing practiced in the fishing nations. 2
- b) 'Poor quality raw materials can never produce a good quality final product' - justify the statement. 2
- c) Write down the necessities of fish processing in Bangladesh. 2
- d) What are the macro and micro elements present in fish and shellfish? 1
2. a) What do you mean by spoilage and deterioration? 1
- b) What is rigor-mortis? Explain the causes of rigor-mortis in fish. 3
- c) Distinguish between chilling and freezing. What is super chilling? 2
- d) List out the different methods of fish chilling. 1
3. a) What is dry ice? Write down different types of ice used in fish preservation. 2
- b) Calculate the energy required if you want to chill 50 kg of raw fish from 33°C to 0°C. 2
- c) Write down the changes associated with chilled fish during storage. 2
- d) What is shelf life? 1
4. a) Write the principles of refrigeration. List out the factors affecting freezing time of fish. 2
- b) Differentiate slow freezing and quick freezing. Which type is preferred in fish processing? 3
- c) What do you mean by glazing and STPP? 2
5. a) What is IQF? 1
- b) Write down the names of commercial freezers used in Bangladesh. Describe working principles of any one of them. 4
- c) Mention the important biochemical changes of frozen fish during storage. 2
6. a) What is fish thawing? Describe different methods of fish thawing. 2
- b) Why fish is frozen at -40°C and stored at -18°C? 2
- c) Give a brief account on changes related with freezing and cold storage of fish. 3
7. Write short notes on the followings (any two): 3.5 x 2
- a) Freeze drying; (b) Fish Fermentation; & (c) Cryogenic freezing

Section: B

8. a) What do you mean by curing? 1
- b) Explain the basic principles of drying and dehydration. 2
- c) Describe the effects of drying on quality of fish. 2
- d) Give a schematic diagram on salted dehydration process of jew fish. 2
9. a) Write down the importance of salting in Bangladesh. 2
- b) Give a detail process of dry salting of Hilsha fish in Bangladesh. 3
- c) What are the problems arises in salt cured fish products? 1
- d) Classify commercial salt on the basis of source. 1
10. a) What are the principles of canning? 1
- b) Write down the advantages of canning over other fish processing techniques. 1
- c) Describe briefly canning operation in fish processing industry. 5
11. a) Classify foods on the basis of acidity. 2
- b) Explain the terms: i) z value; (ii) F value; & (iii) '12 D' Concept 2
- c) Give the features of an ideal 'can' container? 2
- d) Write down advantages of two-piece cans over three-piece cans. 1
12. a) Mention the problems encountered with different cans during storage of canned fish. 3
- b) How surimi is prepared from less priced and easy available fish? 2
- c) Mention the names of some additives and cryoprotectant used in surimi product. 2
13. a) Name the sources of ionizing radiation used in food preservation. Give its significance in fish processing. 2
- b) Fish or shellfish might be irradiated - justify the statement. 2
- c) Describe effects of irradiation on food. 3
14. Write short notes on the followings (any two): 3.5 x 2
- a) Fish smoking; (b) Thermal Death Time Curve (TDT Curve); & (c) Modified atmospheric packaging



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

B. Sc. Fisheries (Hons.) Year -02 Semester-01, Final Examination' 2018

Course No: **MBI-201 (T)**, Course Title: **Marine Biology (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 Marine Biology? How will you apply your knowledge of Marine Biology in the field of marine sector in Bangladesh? 4.0  
b) How marine archaea differ from bacteria? Write down the general characteristics of marine virus with their ecological roles. 3.0
2. a) Why is virus called both living and non-living organism? How marine bacteria contribute in nitrogen fixation and nitrification in marine environment? 3.0  
b) Are marine protozoans autotrophic or heterotrophic? 1.0  
c) Discuss the role of foraminifera in marine aquatic environment. 3.0
3. a) "Phytoplankton is the base of food chain"- explain the statement. 2.0  
b) Differentiate between Calcareous and Siliceous phytoplankton 2.0  
c) Briefly discuss the major factors affecting growth and distribution of phytoplankton in Oceans. 3.0
4. a) What is benthic community? Classify marine benthos with their role in EPS formation. 3.0  
b) "Benthic organisms are important bio-indicator of estuarine system"-Explain the statement. 2.0  
c) "Neritic zone is the productive oceanic zone"- briefly explain. 2.0
5. a) Define Seaweed and Sea grass. What are the potential seaweeds available in Bangladesh coast for commercial culture? 3.0  
b) What is coral and coral reef? What are the probable causes of coral bleaching? 2.0  
c) What are the ecological roles of algae in marine environment? 2.0
6. a) Describe the life cycle of Aurelia. 4.0  
b) What is algal Bloom? Give a brief account of its impact on marine environment. 3.0
7. a) Why hagfishes are called slime eel? 2.0  
b) What do you know about Ichthyoplankton? 1.0  
c) Discuss the physiological mechanism of marine fishes for living in high saline water. 4.0

**Section-B**

8. a) What do you mean by the term "Purging"? 1.0  
b) What are the different types of cephalopods found in ocean environment? 2.0  
c) Describe the life cycle of oyster. 4.0
9. a) What is "Gemmules" and "Smoking" of sponge? 2.0  
b) Why scyphozoans are called true jellyfish? 2.0  
c) Illustrate the life cycle of marine protozoans. 3.0
10. a) Why plankton concentration is high in higher latitude and spring season in marine environment? 2.0  
b) Briefly describe the theories to explain the apparent mutual explosion of the phytoplankton and the zooplankton. 5.0
11. a) What are the ecological roles of marine Arthropods? 2.0  
b) How will you identify a healthy adult *Penaeus monodon*? 2.0  
c) Illustrate the life cycle of shrimp. 3.0
12. a) How does seagrass reproduce? Briefly describe the structure of seagrass. 4.0  
b) Describe the life cycle of seaweed which show alternation of generation. 3.0
13. a) List down ten scientific names and common names of commercially important marine fishes of Bangladesh. 3.0  
b) Describe the life cycle of Hilsha fish in Bangladesh. 4.0
14. Write short notes on **any two** of the followings: 3.5×2  
a) Marine reptiles and birds      b) HNLC      c) Redtide      d) Marine mammals