

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year-1, Semester-2, Final Examination' 2023
Course No: 0831MBI-102T, Course Title: Marine Biology (Theory)
Full 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) Sea creatures include all domains of life- explain. 2
b) Differentiate between bony and cartilaginous fishes. 2
c) Describe the larval nutrition mode in marine fishes with examples. 3
2. a) Discuss how is osmoregulation in marine bony fish different from cartilaginous fish. 4
b) Describe marine fish migration patterns. 3
3. a) Differentiate between seaweed and seagrass biological and ecological aspects. 3
b) Classify reefs based on geomorphology. 4
4. a) When and how do sharks perform buccal pumping and ram ventilation? 3
b) How does a shark maintain buoyancy? 2
c) Differentiate among sharks, rays and skates in morphological context. 2
5. a) Enlist the major classes of marine phytoplankton with two major characters. 3
b) What is algal bloom? Discuss the major sources of nutrients and their impacts on algal bloom in estuarine environment. 4
6. a) Classify marine benthos according to type, size and location. 3
b) Discuss the role of marine benthic organisms on marine ecosystem maintenance. 4
7. Write short notes on **any 02 (two)** of the following: 3.5x 2 = 7
a) Life cycle in clam vs oyster b) HNLCC c) Camouflage in fish

Section-B

8. a) Classify marine bacteria. Write down the importance of marine bacteria. 3
b) Classify marine viruses and write down their role in biological pump. 4
9. a) How diverse hermaphroditism in marine organisms are? 3
b) Why "ovoviviparity" should not be used as a parity mode in marine fishes? 4
10. a) Why are barnacles called suspension feeders? 2
b) Differentiate between anadromous and catadromous fish. 2
b) Draw a labelled diagram showing salt marsh zonation in an estuarine zone. 3
11. a) Classify echinoderms with their larval forms. 3
b) How do echinoderms represent the best model for the evolution of larval modes in marine organisms? 4
12. a) What is the status of marine mammals in Bangladesh? 4
b) Explain the alteration of generations in seaweed. 3
13. a) What is ichthyoplankton? Draw and describe the development stages of ichthyoplankton. 4
b) Describe the ichthyoplankton collection methods. 3
14. Write short notes on **any 02 (two)** of the following: 3.5x 2 = 7
a) The Voyage of challenger b) Barnacle c) Bioturbation.

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B.Sc. Fisheries (Hons.) Year-01, Semester-02; Final Examination, 2023
Course Code:0831WQM102T, Course Title: Water Quality Management(Theory)
Full marks: 70 Time: 3 hours

Answer any05 (five) questions from each section. Figures in the right margin indicate full marks. Use separate answer script for each section.

Section-A

1. a) Conceptualize water quality management in terms of aquaculture and conservation of aquatic ecosystems. 3
b) Explain the interconnection of aquatic ecosystems with water quality. 4
2. a) Describe advanced water quality monitoring and management. 3
b) Give your idea about the application of GIS and RS technology for real-time monitoring of water quality in the Bay of Bengal. 4
3. a) "Temperature of water is directly related to fish physiology and well-being in an aquatic ecosystem". Justify this statement 3
b) Illustrate the interrelationship among light, temperature, and productivity in an aquaculture pond. 4
4. a) Define Dissolve Oxygen (DO). 2
b) Relate between DO and temperature. 2
c) Illustrate the sources of DO in aquatic ecosystems. 3
5. a) Write down the significance of temperature in aquaculture systems. 3
b) How does light intensity and photoperiod affect aquatic organisms? 4
6. a) "Suckermouth Catfish invasion in natural waterbodies is an alarming threat to water quality and habitat". Do you believe their invasion can be managed with common predatory fish control methods? 3
b) Discuss the physical, chemical, and biological means of managing aquatic weeds in an aquaculture pond. 4
7. a) Differentiate between bioaccumulation and biomagnification. 3
b) "Safe water, safe fish, safe consumer health." Establish this statement with scientific backgrounds. 4

Section B

8. a) "The concentration of un-ionized ammonia in waterbodies depends on the temperature and pH" - explain with practical examples. 3
b) Discuss some applicable strategies for managing high ammonia in an aquaculture system. 4
9. a) "Phosphorus fertilizers are more limiting for aquaculture than nitrogen fertilizers." – Justify. 3
b) Illustrate the interrelationship among excess fertilization, eutrophication, and algal bloom. 4
10. a) Mention the common sources of water pollution in aquaculture 2
b) Write down the methods used for managing solid waste in aquaculture systems. 5
11. a) Write down the potential risks of harmful algal blooms (HABs) in waterbody. 3
b) Describe the methods for preventing and controlling phytoplankton blooms in waterbody. 4
12. Suppose you are a 'Technical Service Officer' and fish farmers often come to you for water quality-related suggestions. Now, design an "information collection form" specifying the data types to collect from farmers to understand their problems. 7
13. a) How does overfeeding effect on water quality degradation? 3
b) Recommend some ways of feeding fish with body weight, life stages and environmental conditions to save water quality from overfeeding problems. 4
14. Develop a model of collecting water samples, field testing and lab testing of important physical and chemical parameters using your experience in this course. 7

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B. Sc. Fisheries (Hons.), Year-01, Semester-02 (July-December), Final Examination' 2023

Course No. 0831HPF102T, Course Title: Handling and Preservation of Fish (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) Define Handling and Preservation of Fish. How this knowledge can be applied in fisheries sector? 3
- b) Define proximate composition of fish. Describe the physical structure of fish muscle with diagram. 4
2. a) Evaluate the quality of a fish through organoleptic method. 3
- b) Define thaw rigor. Demonstrate the post mortem changes in fish through a flow diagram. 4
3. a) Explain briefly the cleaning steps in a fish processing plant after finishing the processing work. 2
- b) What do you mean by SOP? Draw a layout of an ideal fish processing plant. 5
4. a) Differentiate between perishable and semi-perishable food products. 2
- b) Discuss briefly how cross contamination affects the quality of fish. 2
- c) Discuss the causative agents responsible for fish spoilage. 3
5. a) Define fish packaging. Explain the functions of fish packaging. 3
- b) Identify good practices in boxing of fish for transportation. 4
6. a) Explain briefly the principles of fish preservation. 3
- b) Describe the factors affecting successful transportation of live fish. 4
7. a) Every 1-hour delay in fish chilling reduces 1-day shelf-life of fish - justify. 3
- b) Evaluate the quality problems occur in fish during freezing and subsequent storage. 4

Section B

8. a) Diagrammatically present the operations in catch handling of pelagic and demersal fish. 3
- b) Outline briefly the good handling practices for the harvested fish on the deck of fishing vessels. 4
9. a) Vitamins and minerals are essential to maintain biological functions-justify. 3
- b) Write down the functions of fish protein. Classify fish protein based on their solubility. 4
10. a) How gapping, toughness and drip-loss related with the quality changes during rigor mortis? 3
- b) Discuss briefly the factors that contribute in rigor mortis of fish. 4
11. a) Differentiate between quick- and slow freezing. Why fish are frozen at -40 °C but stored at -18 °C? 3
- b) Draw and explain the temperature profile of freezing fish. Write down the importance of "thermal arrest time" in the freezing curve. 4
12. a) Define glazing. Explain the different methods of fish chilling. 3
- b) "Fish muscle is more easily digestible than other meat muscle"- justify the statement. 2
- c) Differentiate between dark muscle and white muscle. 2
13. a) What is conditioning? How conditioning helps in reduction of fish mortality during transportation? 3
- b) Define IQF. Handling and transportation influence the freshness of fish - justify. 4
14. Write short notes on **any 02 (two)** of the following: 3.5x2=7
- a) Air freight packaging; b) Sous vide technology; and c) Hilsha supply chain.

Chattogram Veterinary and Animal Sciences University, Chattogram
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B. Sc. Fisheries (Hons.) Year -01, Semester-02 (July-December), Final Examination' 2023

Course No: 0831ICH102T, Course Title: Ichthyology (Theory)

Total Marks: 70

Time: 3 hours

Answer any 05 (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) Define fish and pisces. 2
- b) "Studying Ichthyology has great significance for the students of Fisheries"-Justify. 2
- c) Enlist the key features of Dipnoi, Acanthodii and Petromyzonidae. 3
2. a) Classify fish muscle. 2
- b) Describe the different bones found in fish skull with diagram. 5
3. a) Differentiate between holobranch and hemibranch. 2
- b) Write down the structural differences of gill in Agnatha, Chondrichthyes and Osteichthyes. 5
4. a) What are digestive tract and digestive gland? 2
- b) Draw the digestive tract found in Agnatha. 2
- c) Briefly describe the variations and adaptations of stomach and intestine that exist in different groups of fishes. 3
5. a) Enlist the structural variations observed in freshwater and marine water fish kidneys. 3
- b) Classify kidney on the basis of configuration with examples. 4
6. a) Briefly describe the structure of light organs found in fish. 4
- b) How does fish discharge electricity? 3
7. a) Draw and label the diagram of fish brain. 2
- b) Enlist the cranial nerves found in fish with their location and functions. 5

Section-B

8. a) Enlist the primitive characteristics of Chimaeras. 2
- b) Differentiate between Crossopterygii and Actinopterygii. 2
- c) Write at least three most notable characters with examples of each of the following orders: 3
- i) Pleuronectiformes, ii) Pristiophoriformes, iii) Rajiformes
9. a) Write about various kinds of body shapes of fish. 2
- b) What are the different types of caudal fins found in fish? 2
- c) Are there any derivatives of fish skin? If yes, explain briefly. 3
10. a) What is gonad? 1
- b) Distinguish between gymnovarian and cystovarian fish. 2
- c) Discuss about the urogenital systems in female fish. 4
11. a) "Heart acts as a pumping organ in fish"-Justify your answer. 2
- b) Differentiate bulbus and conus arteriosus in fish. 2
- c) Illustrate and describe various components of hearts. 3
12. a) How would you differentiate between cranial and spinal nerve? 2
- b) Enlist the various parts of midbrain with their functions. 2
- c) Draw the cross-section of spinal cord of fish. 3
13. a) Point out the touch receptor organs in fish. 2
- b) How does fish response in light and dark environment? 2
- c) What is lateral line? How lateral line act as sensory organ? 3
14. Write short note on any 02 (two) of the following: 3.5 × 2 = 7
- a) Gas gland and rete mirabile, b) Swim bladder, c) Accessory respiratory organs, and d) Bowman's capsule.

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B.Sc. Fisheries (Hons.) Year - 1 Semester -2 (July-December), Final Examination, 2023
Course No: 0831FWA102T, Course Title: Freshwater Aquaculture (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. Define aquaculture. How aquaculture is currently benefiting Bangladesh in terms of protein supply, GDP, export earnings and employment opportunity? 3
b. Enumerate the major challenges and opportunities of aquafarming in Bangladesh. 4
2. a. What do you mean by creek aquaculture? 3
b. Write down the creek aquaculture techniques for sustainable production of fish in the Kaptai lake. 4
3. a. Which techniques do you follow to control insect and predator in pond? 3
b. Which criteria would you follow to select an ideal site for giant freshwater prawn farming? 4
4. a. Define induced breeding. 2
b. Write down the broodstock management techniques in aquaculture system. 5
5. a. What do you mean by polyculture? 2
b. Write down the polyculture techniques that are most commonly used in Bangladesh. 5
6. a. Mention the characteristics of pond site selection of ideal aquafarming. 5
b. Discuss the steps of pond preparation techniques after harvesting the previous crop. 2
7. Write short notes on **any 2 (two)** of the following: 3.5x2=7
i) Organic Aquaculture; ii) Broodstock Management and iii) Pen Culture.

Section B

8. a. What are the major causes of mortality during transportation? 3
b. List down the FDA approved anesthetics for fish with recommended dosages. 4
c. Why conditioning is important before packaging and stocking of live fish?
9. a. Differentiate organic and integrated aquafarming. 3
b. Aquaculture provides the highest possible production per unit aquatic area at minimum cost within the shortest possible time. Justify this statement. 4
10. a. How would you design an ideal dike for a 50 decimal semi-intensive fish pond? Consider soil texture as sandy clay and pond water depth is 1.0 meter. 4
b. How would you conduct land, soil and water survey before construction of fish farm? 3
11. a. Describe Small Indigenous Species (SIS) polyculture with carps. 5
b. How aquatic weed can affect your fish production? 2
12. a. Enumerate the method of aquascaping with required materials. 5
b. Fish harvesting is easier in Cage rather than Pen. Justify this statement. 2
13. a. Briefly describe the Angel fish breeding technique in aquarium. 4
b. How would you control algal bloom in your fish farm ponds? 3
14. Write short notes on **any 2 (two)** of the following: 3.5x2=7
i) Liming and Fertilization; ii) Induced Breeding and iii) Post-stocking Management.

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year-01, Semester-02; Final Examination, 2023
Course Code: 0831ASS102T, Course Title: Aquatic Soil Science (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 Soil and Soil Science. 2
b) Describe how you will utilize the knowledge of aquatic soil science in fisheries. 5
2. a) "Extremely acidic and alkaline conditions are undesirable in soils" - Justify. 3
b) Discuss the pH buffering system in soil with appropriate examples. 4
3. a) Write about the effects of bioturbation on the type of animal density, feeding and burrowing strategies. 2
b) Name five groups of Bio-turbators. 1
c) Illustrate the functions of bioturbation with an umbrella term. 4
4. a) Differentiate between soil salinity and salinization. 3
b) Describe the causes of soil salinization. 4
5. a) Define acid-sulphate soil. 2
b) Describe the process of formation of acid-sulphate soil. 2
c) Recommend your suggestions to manage acid-sulphate soil. 3
6. a) Define soil biota. 2
b) "Microbes act as a soil-forming agent"- Explain. 2
c) Discuss the optimal conditions of microbial growth and reproduction in soils. 3
7. a) Write down the importance of studying bottom mud in aquaculture and fisheries. 3
b) What are the challenges of open water sediment management and how can you overcome those? 4

Section B

8. a) Draw a schematic diagram of a soil profile. 2
b) Elaborate the suitability of soil textural classes for fish pond construction and fish culture. 5
9. a) Write down the importance of cation exchange capacity (CEC) in soils. 3
b) Illustrate the cation and anion exchange by plant root hair. 4
10. a) Enlist the components of soil. 2
b) Briefly discuss the different components of soil. 5
11. a) Illustrate the ventilation mechanism of burrowing organisms. 3
b) Write down the role of 'bioturbators' in nitrogen cycling. 4
12. a) "Bottom mud acts as a storehouse of nutrients"- Explain this statement. 2
b) Enlist some potential drawbacks of using bottom mud as a nutrient source. 2
c) Criticize and recommend common bottom mud management techniques in Bangladesh. 3
13. a) Define salt-affected soil. 3
b) Describe the three general rules for reclaiming salty soils. 4
14. Write down short notes on any 02 (TWO) of the following: 3.5x 2= 7
i) Soil-water interaction; ii) Management techniques of clay soil & iii) Physical properties of soil

Answer all the questions.

Section-A

1. Correct the following sentences if they are incorrect. If a sentence is correct, just copy it. 5
 - a) The girl resembles with her mother.
 - b) Do you know where did he go last night?
 - c) The old man was died last month.
 - d) I would have studied at Oxford if I had a little more money.
 - e) Are your father doing well in his business?

2. Complete the following sentences. 5
 - a) United we stand _____.
 - b) Had I the wings of a bird _____.
 - c) You had better _____.
 - d) In order to lead a healthy life, _____.
 - e) _____ since money cannot guarantee happiness.

3. Write a letter to the editor of a newspaper complaining about the frequent failure of electric supply in your locality. 7

Section B

4. Change the following sentences as directed: 5
 - a) He seemed to have done the work. (Complex)
 - b) This forbidden book lasted longer than all the rest. (Positive)
 - c) Let it be done by you now. (Change the voice)
 - d) Father said, "Little strokes fell great oaks." (Change the speech)
 - e) Every student can succeed. Their success depends on the condition of working hard. (Join the sentences into a complex sentence)

5. Write a paragraph of about 150 words on "how to use a mobile phone productively". 5

6. Read the passage carefully and answer the questions that follow. 8

The Industrial Revolution in Britain

The Industrial Revolution began in Britain in the mid-1700s and by the 1830s and 1840s has spread to many other parts of the world, including the United States. In Britain, it was a period when a largely rural, agrarian* society was transformed into an industrialised, urban one. Goods that had once been crafted by hand started to be produced in mass quantities by machines in factories, thanks to the invention of steam power and the introduction of new machines and manufacturing techniques in textiles, iron-making and other industries.

The foundations of the Industrial Revolution date back to the early 1700s, when the English inventor Thomas Newcomen designed the first modern steam engine. Called the 'atmospheric steam engine', Newcomen's invention was originally used to power machines that pumped water out of mines. In the 1760s, the Scottish engineer James Watt started to adapt one of Newcomen's models and succeeded in making it far more efficient. Watt later worked with the English manufacturer Matthew Boulton to invent a new steam engine driven by both the forward and backward strokes of the piston, while the gear mechanism it was connected to produced rotary motion. It was a key innovation that would allow steam power to spread across British industries.

The demand for coal, which was a relatively cheap energy source, grew rapidly during the Industrial Revolution, as it was needed to run not only the factories used to produce manufactured goods, but also steam-powered transportation. In the early 1800s, the English engineer Richard Trevithick built a steam-powered locomotive, and by 1830 goods and passengers were being transported between the industrial centres of Manchester and Liverpool. In addition, steam-powered boats and ships were widely used to carry goods along Britain's canals as well as across the Atlantic.

Britain had produced textiles like wool, linen and cotton, for hundreds of years, but prior to the Industrial Revolution, the British textile business was a true 'cottage industry', with the work performed in small workshops or even homes by individual spinners, weavers and dyers. Starting in the mid-1700s, innovations like the spinning jenny and the power loom made weaving cloth and spinning yarn and thread much easier. With these machines, relatively little labour was required to produce cloth, and the new, mechanised textile factories that opened around the country were quickly able to meet customer demand for cloth both at home and abroad.

The British iron industry also underwent major change as it adopted new innovations. Chief among the new techniques was the smelting of iron ore with coke (a material made by heating coal) instead of the traditional charcoal. This method was cheaper and produced metals that were of a higher quality, enabling Britain's iron and steel production to expand in response to demand created by the Napoleonic Wars (1803-15) and the expansion of the railways from the 1830s.

The latter part of the Industrial Revolution also saw key advances in communication methods, as people increasingly saw the need to communicate efficiently over long distances. In 1837, British inventors William Cooke and Charles Wheatstone patented the first commercial telegraphy system. In the 1830s and 1840s, Samuel Morse and other inventors worked on their own versions in the United States. Cooke and Wheatstone's system was soon used for railway signalling in the UK. As the speed of the new locomotives increased, it was essential to have a fast and effective means of avoiding collisions.

The impact of the Industrial Revolution on people's lives was immense. Although many people in Britain had begun moving to the cities from rural areas before the Industrial Revolution, this accelerated dramatically with industrialisation, as the rise of large factories turned smaller towns into major cities in just a few decades. This rapid urbanisation brought significant challenges, as overcrowded cities suffered from pollution and inadequate sanitation.

Although industrialisation increased the country's economic output overall and improved the standard of living for the middle and upper classes, many poor people continued to struggle. Factory workers had to work long hours in dangerous conditions for extremely low wages. These conditions along with the rapid pace of change fuelled opposition to industrialisation. A group of British workers who became known as 'Luddites' were British weavers and textile workers who objected to the increased use of mechanised looms and knitting frames. Many had spent years learning their craft, and they feared that unskilled machine operators were robbing them of their livelihood. A few desperate weavers began breaking into factories and smashing textile machines. They called themselves Luddites after Ned Ludd, a young apprentice who was rumoured to have wrecked a textile machine in 1779.

The first major instances of machine breaking took place in 1811 in the city of Nottingham, and the practice soon spread across the country. Machine-breaking Luddites attacked and burned factories, and in some cases they even exchanged gunfire with company guards and soldiers. The workers wanted employers to stop installing new machinery, but the British government responded to the uprisings by making machine-breaking punishable by death. The unrest finally reached its peak in April 1812, when a few Luddites were shot during an attack on a mill near Huddersfield. In the days that followed, other Luddites were arrested, and dozens were hanged or transported to Australia. By 1813, the Luddite resistance had all but vanished.

Complete the notes below. *(Do not copy the questions, write only the answers.)*

Choose ONE WORD ONLY from the passage for each answer.

Britain's Industrial Revolution

Steam power

- Newcomen's steam engine was used in mines to remove water.
- In Watt and Boulton's steam engine, the movement of the a) was linked to a gear system.
- A greater supply of b) was required to power steam engines.

Textile industry

- Before the Industrial Revolution, spinners and weavers worked at home and in c)
- Not as much d) was needed to produce cloth once the spinning jenny and power loom were invented.

Do the following statements agree with the information given in Reading Passage?

Write:

- TRUE** if the statement agrees with the information
FALSE if the statement contradicts the information
NOT GIVEN if there is no information on this

- e) Britain's canal network grew rapidly so that more goods could be transported around the country.
- f) Costs in the iron industry rose when the technique of smelting iron ore with coke was introduced
- g) Samuel Morse's communication system was more reliable than that developed by William Cooke and Charles Wheatstone.
- h) The economic benefits of industrialisation were limited to certain sectors of society.