FMRT

Khulna University, Khulna

School: Life Science **Discipline: Fisheries and Marine Resource Technology**

Program: BSc in Fisheries (Honours) **Year:** 1st **Term:** I **Session:** 2025-26

Course Code: 0831 06 FMRT 1101 **Course Title:** Fisheries Zoology

Credit: 03 **Time:** 3 hours **Marks:** 60

*The figure in the margin indicates full marks. *Use separate answer script for each section.

SECTION – A

[There are **FOUR** questions in this section. Answer any **THREE** questions.]

Q.1 a) What do you mean by "Fisheries Zoology"? [L1; CLO2] 02

b) Discuss the importance of fisheries zoology in sustainable fisheries resource management. [L3; CLO2] 04

c) Enlist the major criteria for classifying animals into different phyla. [L1; CLO1] 02

d) Distinguish between chordates and non-chordates on the basis of general characteristics. [L4; CLO1] 02

Q.2 a) Give a detailed account of the names, structures and functions of different appendages of *Macrobrachium rosenbergii*. [L2; CLO1] 05

b) Compare the characteristic features of phylum Cnidaria and Echinodermata with appropriate example. [L4; CLO1] 03

c) Classify aquatic animals with regard to body symmetry. [L2; CLO1] 02

Q.3 a) Describe the morphological features of a bony fish with suitable diagram. [L2; CLO1] 05

b) Distinguish between cartilaginous and bony fishes with appropriate examples. [L4; CLO1] 03

c) State the economic roles of coral reefs in marine ecosystems. [L2; CLO1] 02

Q.4 a) Give a labeled description of oral and aboral surfaces of *Asterias rubens*. [L2; CLO1] 05

b) Explain the defensive mechanisms of cuttlefish highlighting the role of "ink gland". [L2; CLO1] 03

c) "*Sepia* follows a unique feeding strategy to capture prey."- Justify the statement. [L5; CLO1] 02

SECTION – B

[There are **FOUR** questions in this section. Answer any **THREE** questions.]

Q.5 a) Discuss the ecological significance of five different aquatic animals. [L1; CLO3] 05

b) How do aquatic animals adapt to extreme temperature and salinity variation? [L4; CLO4] 05

Q.6 a) Discuss the principles of evolution. [L4; CLO4] 05

b) Narrate the concept of evolution based on origin of life. [L4; CLO4] 05

Q.7 a) Describe the types of evolution with examples. [L4; CLO4] 04

b) Write short note on: a) Natural selection; b) Bottleneck effect. [L2; CLO4] 06

Q.8 a) Distinguish between adaptation and adaptive radiation. [L4; CLO4] 05

b) Describe adaption mechanism of aquatic animals based on light availability. [L3; CLO4] 05

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School: Life Science **Discipline: Fisheries and Marine Resource Technology**

Program: BSc in Fisheries (Honours) **Year:** 1st **Term:** I **Session:** 2025-26

Course Code: 0831 06 FMRT 1103 **Course Title:** Freshwater Ecology

Credit: 03 **Time:** 3 hours **Marks:** 60

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SECTION – A

[There are **FOUR** questions in this section. Answer any **THREE** questions.]

Q.1 a) Define freshwater ecology and ecological niche. [L1; CLO1] 03

b) What are the limiting factors in an ecosystem? [L1; CLO1] 02

c) How will you apply ecological knowledge in fish culture? [L3; CLO1] 03

d) What do you mean by trophic level and trophic structure? [L1; CLO1] 02

Q.2 a) Discuss the fundamental steps of pond ecosystem with a suitable flow diagram. [L6; CLO2] 04

b) Compare between: 06
i) Autotroph and heterotroph; ii) Lentic and lotic habitat; iii) Predation and parasitism. [L2; CLO2]

Q.3 a) Differentiate between benthic and pelagic communities with example. [L2; CLO3] 03

b) Describe the zonation pattern of a lake with a suitable figure. [L2; CLO1] 03

c) Organize the ecological classification of freshwater organisms on the basis of their mode of life and give example of each. [L3; CLO3] 04

Q.4 a) Compare river and estuary on the basis of ecology and biodiversity. [L2; CLO3] 03

b) Show the origin and pathway of major 4 rivers in Bangladesh. [L1; CLO4] 04

c) Describe the role of river in the field of fisheries resources. [L2; CLO4] 03

SECTION – B

[There are **FOUR** questions in this section. Answer any **THREE** questions.]

Q.5 a) Define the terms: i) Species; ii) Population; iii) community. [L1; CLO8] 03

b) Discuss different types of interaction between two species in the community. Give example for each category. [L6; CLO4] 07

Q.6 a) State the significance of energy flow in the ecosystem. [L1; CLO5] 02

b) Illustrate the nitrogen cycle. Discuss different forms of nitrogen fixation in the ecosystem. [L2; CLO6] 06

c) Narrate the importance of decomposition in the ecosystem. [L5; CLO5] 02

Q.7 a) Define the terms: i) Concept of climax; ii) Standing crops; iii) Carrying capacity. [L1; CLO9] 03

b) State limiting factors. Explain how do they play role in the ecosystem? [L2; CLO9] 04

c) Explain the factors affecting the carrying capacity of an aquatic environment. [L4; CLO7] 03

Q.8 Write short notes on the followings: [L2; CLO7,8,9] $4 \times 2.5 = 10$

a) Liebig's law of minimum; b) Shelford's law of tolerance; c) Population dispersion; d) Population age distribution.

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School: Life Science **Discipline: Fisheries and Marine Resource Technology**

Program: BSc in Fisheries (Honours) **Year:** 1st **Term:** I **Session:** 2025-26

Course Code: 0831 06 FMRT 1105 **Course Title:** Aquatic Resources

Credit: 03 **Time:** 3 hours **Marks:** 60

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SECTION – A

[There are **FOUR** questions in this section. Answer any **THREE** questions.]

Q.1 a) What is meant by aquatic resource? Why do you need to study Aquatic Resource as a fisheries student? [L2; CLO1] 03

b) "Fish is a renewable resource."- Explain the statement. [L4; CLO1] 03

c) Differentiate: i) capture and culture fisheries; ii) industrial and artisanal fisheries. [L4; CLO1] 04

Q.2 a) Classify the fisheries resources. [L2; CLO1] 03

b) Give an account of five commercial fish species available in Bangladesh with local, common and scientific name. [L1; CLO2] 05

c) Mention the roles and responsibilities of DoF in fisheries sector of Bangladesh. [L2; CLO3] 02

Q.3 a) What is endangered fish species? Give two examples. [L1; CLO2] 02

b) List the categories of small indigenous fish species (SIFS) based on vitamin A content each with two examples. [L1; CLO2] 05

c) Mention the major threats of SIFS resources in Bangladesh. [L2; CLO3] 03

Q.4 a) Describe the major fishing grounds with important fish species in the Bay of Bengal. [L2; CLO2] 05

b) What do you know about the recent Norwegian research survey of Bangladesh's marine realm in Bay of Bengal? [L1; CLO2] 05

SECTION – B

[There are **FOUR** questions in this section. Answer any **THREE** questions.]

Q.5 a) Give a brief overview of conditionally renewable, non-renewable, and renewable resources. [L2; CLO1, 4] 03

b) Differentiate between aquatic resources and fisheries resources. [L2; CLO4] 03

c) What are the major global energy problems, and what measures can be taken to address them? [L5; CLO4] 02

d) What is meant by the term "alternative energy"? [L1; CLO1, 4] 02

Q.6 a) Illustrate the mechanism of gas production in the sea. [L3; CLO4] 04

b) List the advantages and disadvantages of tidal barrages and tidal current turbines. [L1; CLO4] 03

c) Write down the production of energy through wave focusing devices. [L2; CLO6] 03

Q.7 a) What is geothermal energy? [L1; CLO3] 01

b) Briefly elucidate the geothermal energy generation technique utilizing the flash steam. [L3; CLO3] 04

c) "We will not run out of geothermal energy."- Justify the statement. [L5; CLO3] 02

d) Identify the challenges and opportunities facing the aquarium fish industry in Bangladesh. [L3; CLO5] 03

Q.8 a) What is salinity gradient power? [L1; CLO4] 1.5

b) Write down the salinity gradient energy produced from pressure-related osmosis. [L2; CLO4] 04

c) How aquatic resources could be potential sector for tourism development in Bangladesh? [L5; CLO5] 03

d) "Petroleum is a fossil fuel."- Justify the statement. [L5; CLO4] 1.5

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School: Life Science **Discipline: Fisheries and Marine Resource Technology**

Program: BSc in Fisheries (Honours) **Year:** 1st **Term:** I **Session:** 2025-26

Course Code: 0531 06 Chem 1151 **Course Title:** Chemistry

Credit: 03 **Time:** 3 hours **Marks:** 60

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SECTION – A

[There are **FOUR** questions in this section. Answer any **THREE** questions.]

Q.1 a) Discuss the different ways of expressing the concentration of a solution. [L6; CLO1, 2] 04

b) Calculate the pH of a 0.25 M NaOH solution. [L5; CLO1, 2] 03

c) Categorize and discuss the various simple titration techniques. [L4; CLO2] 03

Q.2 a) State the Bronsted –Lowry concept and why Bronsted-Lowry concept is superior to Arrhenius concept? [L1; CLO2] 03

b) Derive mathematical expression for the rate constant of a reaction (A⟶ products) of the first order. [L5; CLO2, 7] 04

c) Compound A decomposes to form B and C. The reaction is first order, At 25°C the rate constant for the reaction is 0.450 s^{-1}, and what is the half-life of A at 25°C? [L5; CLO2, 3] 03

Q.3 a) Chemical equilibrium is a dynamic equilibrium; justify the statement. [L2; CLO7, 10] 02

b) Establish a relationship between K_P and K_c. [L2; CLO2, 3] 04

c) Discuss the manufacturing of H_2SO_4 through the contact process. [L6; CLO2, 3] 04

Q.4 a) Write the equilibrium constant expression for the reaction: $N_2O_5\ (g) \rightleftharpoons NO_2\ (g) + O_2\ (g)$. [L2; CLO3] 03

b) Illustrate the Beer-Lambert law and show its application. [L2; CLO4] 03

c) Describe the determination procedure of the unknown concentration of $KMnO_4$ through UV-Visible spectrophotometer? [L6; CLO5, 6] 04

SECTION – B

[There are **FOUR** questions in this section. Answer any **THREE** questions.]

Q.5 a) Define an ionic bond with suitable examples. [L1; CLO1] 02

b) Illustrate the formation of an ionic bond through the transfer of electrons between atoms. [L2; CLO8] 03

c) In the ethene molecule, the carbon-carbon double bond is described as consisting of one sigma (σ) bond and one pi (π) bond. Using the concept of hybridization, explain why a pi (π) bond cannot be formed without the prior formation of sigma (σ) bond, and illustrate how the orientation of unhybridized p-orbitals leads specifically to pi (π) bonding. [L5; CLO11] 05

Q.6 a) The molecular formula $C_4H_{10}O$ represents several isometric alcohols. 04
i) Write the structural formulas for all possible isometric alcohols with this formula.
ii) Provide the correct IUPAC name for each isomer. [L2; CLO9]

b) Illustrate the synthesis of primary and secondary alcohol using Grignard reagents. [L2; CLO12] 04

c) Compare the acidity of alcohols (R-OH) with that of water (H-OH). [L2; CLO12] 02

Q.7 a) An alkene A (Molecular formula C_5H_{10}) on ozonolysis gives a mixture of two compounds, B and C. Compound B gives positive Fehling's test and forms iodoform on treatment with I_2 and NaOH. Compound C does not give Fehling's test but forms iodoform. Identify the compounds A, B, and C. Write the reaction for ozonolysis. [L5; CLO12] 06

b) A laboratory technician has two unlabeled bottles, one containing ethanal (CH_3CHO) and the other containing ethanol (CH_3CH_2OH). Select a suitable chemical reagent that can be used to distinguish between these two compounds and write the chemical reaction that occurs with the chosen reagents. [L5; CLO9] 04

Q.8 a) Explain why chloroacetic acid is stronger than acetic acid? [L2; CLO11] 02

b) Define heterocyclic compound with three examples. [L1; CLO13] 02

c) Show synthesis of pyrol from succinimide and furan. [L1; CLO13] 03+03 =06

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Program: BSc in Fisheries (Honours) | **Year: 1st** | **Term: I** | **Session: 2025-26**

Course Code: 0231 06 Eng 1153 | **Course Title: Communicative English**

Credit: 03 | **Time: 3 hours** | **Marks: 60**

***The figure in the margin indicates full marks.** ***Use separate answer script for each section.**

SECTION – A

[There are FOUR questions in this section. Answer any THREE questions.]

Q.1 **a)** Explain the following word formation process with examples: **1 x 5 = 05**
i) Blending; ii) Eponym; iii) Coinage; iv) Abbreviation; v) Borrowing. **[L2; CLO1]**

b) Change the following words as directed and make one sentence using each of the changed words: **1 x 5 = 05**
i) Parent (Adjective); ii) Navigation; (verb) iii) Frequency (adverb); iv) Sustain (Adjective); v) Tidal (Noun). **[L6; CLO2]**

Q.2 **a)** Identify the underlined clauses: **1 x 5 = 05**
i) When the storm ended, the fishermen returned to the sea.
ii) Scientists believe that marine pollution affects biodiversity.
iii) The vessel which uses digital sonar, locates a large fish shoal.
iv) The coastal area that supports shrimp culture needs protection.
v) Marine biologists explained why the fish population declined. **[L3; CLO1]**

b) Fill in the blanks using suitable parts of speech: **1 x 5 = 05**
i) The _____ of fish stocks is important for sustainable fisheries management.
ii) Marine organisms cannot survive in highly _____ water.
iii) The hatchery workers _____checked the oxygen level in the tanks.
iv) Excessive plastic waste causes serious marine _____.
v) Researchers _____ the movement of fish using digital sonar systems. **[L6; CLO2]**

Q.3 **a)** Transform the followings as directed: **1 x 5 = 05**
i) Waste not, want not. (Complex)
ii) Students take help from ChatGPT. (Passive)
iii) Digital sonar systems are more effective than traditional fish detection methods. (Positive)
iv) The marine scientist said to the young reserchers, "Pollution is affecting fish reproduction." (Indirect Speech)
v) The coastal mangrove ecosystem is very rich in biodiversity. (Exclamatory). **[L5; CLO2]**

b) Join the followings to form a meaningful sentence. **1 x 5 = 05**
i) The sea was rough. The fishermen continued their journey.
ii) The scientist collected samples. He analyzed marine biodiversity.
iii) The aquaculture system is modern. It ensures high fish yield.
iv) The salinity increased. The fish population was affected.
v) The marine biologist observed the ecosystem. She reported her findings. **[L4; CLO2]**

Q.4 **a)** Show the differences between scanning and skimming as reading techniques. **[L4; CLO3]** **05**

b) Read the following passage and make a summary of it: **05**

Freshwater ecosystem includes rivers, lakes, ponds, reservoirs, and wetlands that contain low salt concentration. This ecosystem is vital because it supports a wide range of aquatic organisms such as fish, plankton, algae, and aquatic plants. Freshwater bodies provide breeding and feeding grounds for many fish species that are important for aquaculture and inland fisheries. In a healthy freshwater ecosystem, the balance between producers, consumers, and decomposers is maintained. Producers like algae and aquatic plants produce oxygen through photosynthesis, while fish and other animals depend on them for food. However, freshwater ecosystem is increasingly being threatened by pollution, overfishing, industrial waste, and agricultural runoff. These factors reduce water quality and harm fish production. Conservation of freshwater resources is essential for sustainable fisheries development. Proper management, pollution control, and habitat restoration can help maintain biodiversity and improve fish production. **[L6; CLO3]**

SECTION – B

[There are FOUR questions in this section. Answer any THREE questions.]

Q.5	**a)**	Describe the importance of intonation and stress in English grammar. **[L2; CLO4]**	**05**
	b)	Show how speaker-listener rapport takes place. **[L4; CLO4]**	**05**
Q.6		Write a paragraph on "Impact of climate change on Fisheries and Marine Life". [L6; CLO3]	**10**
Q.7	**a)**	Why is documentaion in academic writing important? **[L2; CLO5]**	**05**
	b)	Write a note on the process of academic writing. **[L3; CLO5]**	**05**
Q.8	**a)**	Describe the techniques of improving listening skills in English. **[L6; CLO6]**	**05**
	b)	Show a functional statement from workplace communication perspective using each of the following notions: i) Apology; ii) Rejection; iii) Appreciation; iv) Request; v) Invitation. **[L5; CLO4]**	**05**