

KHULNA UNIVERSITY, KHULNA

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

Program: MS in Coastal & Marine Science

Examination: MS 1st Year 1st Term

Session: 2025-26

Course: 0831 06 CMS-5101

Course Title: Physical Oceanography and Hydrography

Credit: 03

Time: 3 hours

Marks: 60

*Digits within third bracket indicate learning level and course learning outcomes

*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) Define trench with three examples mentioning their length, width and depth. [5;2] 04
b) Briefly narrate two major oceanic expeditions in the history of oceanography. [3;1] 06
- Q.2 a) List the major elements responsible for salinity with mentioning their percentages. [4;2] 03
b) Suppose, you have 5000 litres of 7 ppt saline water. What measures will you take to adjust its salinity at 12 ppt using a brine solution of 250 ppt? [5;2] 03
c) What are the reasons of increase and decrease of salinity in ocean water? [2;2] 04
- Q.3 a) 'Thermohaline circulation occurs much higher in the polar region rather than in the tropical area' – explain why? [4;3] 03
b) Narrate the role of the major wind forces in the system of horizontal ocean currents. [6;3] 03
c) Give a brief picture of the major surface currents of the Atlantic Ocean with a diagram. [2;3] 04
- Q.4 Narrate the details of the following events of the Bay of Bengal: 5+3+2 = 10
a) Geography (with sketch); b) Physical features; and c) Economic use. [6;3]

SECTION – B

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

- Q.5 a) How will you differentiate the concept of deep water and shallow water wave? [2;6] 03
b) Explain the concept of mass conservation law. [4;6] 02
c) Describe the formation process and characteristics of swell. [5;6] 05
- Q.6 a) Mention the major entrances of tidal waves penetrating into the waterways of Bangladesh. [4;7] 03
b) Define 'Tidal constituent'. Narrate the modified chart datum for Bangladesh. [1;5;7] 1+3= 04
c) Briefly describe the reasons of two bulges in the earth. [6;7] 03
- Q.7 a) Illustrate air-sea interaction? [1;8] 02
b) Illustrate the average temperature, salinity and density of the world ocean by latitude. [2;8] 04
c) How is the magnitude of Coriolis effect related with latitude? Explain with example. [4;8] 04
- Q.8 a) Write notes on the following: 4x2.5= 10
a) Geostrophic current; b) Heat budget; c) Atmospheric properties influencing ocean; and d) Ocean renewable energy. [2; 3,7,6,8]

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Examination: MS 1st Year 1st Term

Session: 2025-26

Course: 0831 06 CMS-5103

Course Title: Estuarine Ecosystem and Management

Credit: 03

Time: 3 hours

Marks: 60

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*Use separate answer script for each section.

SECTION – A

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

- Q.1 a) Define estuary. Why is estuary important? [1;2; 1] 04
b) Distinguish between positive and negative estuary. [4; 1] 03
c) 'All estuaries are brackish, but not all brackish waters are estuarine' – explain with example. [5; 1] 03
- Q.2 a) Describe the different categories of estuarine species. [2;2] 03
b) 'Estuarine food web is very complex' – justify. [4;2] 04
c) How do estuarine organisms respond to salinity stress? [3;2] 03
- Q.3 a) Outline the factors that limit the maximum production of estuarine phytoplankton. [2; 3] 03
b) How do primary consumers play important role in the estuary? [3; 3] 04
c) 'Decomposers are indispensable for stabilizing the estuarine ecosystem' – explain. [4;3] 03
- Q.4 a) Differentiate between suspension feeders and deposit feeders. [4;3] 03
b) Draw an energy flow diagram for mangrove estuary. [3; 4] 03
c) Discuss the factors that affect the composition of fish faunas in the estuary. [6;4] 04

SECTION – B

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

- Q.5 a) 'Estuarine environments are considered as the most productive aquatic resources on the earth' – justify. [5; 5] 03
b) Narrate your ideas regarding coastal pollution due to diffuse sources. [4;5] 03
c) How does St. Martin's island become polluted vigorously due to continuous pressure of tourism? Explain these with suitable remedies to conserve the island. [6;5] 04
- Q.6 a) 'The main aim in any assessment of human impacts is to detect stresses – justify. [5; 5] 03
b) Differentiate between chronic and acute pollution with example. [2; 5] 03
c) Narrate your ideas about the conflicting uses of estuary in the context of Bangladesh. [6; 5] 04
- Q.7 a) Why is EIA necessary for estuary management? [1; 6] 03
b) Discuss the approach of integrated estuarine assessments. [3;6] 03
c) 'The simplest response of an individual organism to a stressor can be detected through toxicity testing' – justify. [6;6] 04
- Q.8 a) 'The main objective of estuarine management is to devise a framework within which man may coexist with nature' – justify the statement with example. [5;7] 05
b) Discuss the impact of climate change on estuaries in Bangladesh. [5; 7] 05

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

Program: MS in Coastal & Marine Science **Examination:** MS 1st Year 1st Term **Session:** 2025-26
Course: 0831 06 CMS-5111 **Course Title:** Operational and Computational Oceanography **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) Clarify the importance of “Operational oceanography”? [4;1] 02
b) State the scope of its different applications. [3;1] 03
c) List the agents that providing advisory services and the beneficiary groups in operational oceanography. [4;2] 05
- Q.2 a) Narrate the scheduled functions of the GOOS. 03
b) What is observation network in operational oceanography? [2;2] 02
c) Write down the essential components and their role in the observation network. [3;2] 05
- Q.3 a) Compile a list of important tools in In-Situ ocean observing systems. [6;1] 03
b) What is an OMNI Buoy? [1;2] 02
c) Describe the configuration and function of an OMNI Buoy with a diagram. [2;2] 05
- Q.4 a) Discuss the scope of Digital Ocean in Bangladesh. [1,3;2] 05
b) Elucidate the objectives imperative for the implementation of Digital Ocean. [6;2] 05

SECTION – B

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

- Q.5 a) What is data warehouse? How does a data warehouse work? [2;3] 1+3 = 04
b) Discuss the benefits of using data warehouse for ocean study in Bangladesh. [6;3] 03
c) ‘WOD is a powerful warehouse’ - explain. [5;3] 03
- Q.6 a) Outline the components and data platforms of GTSP. [2;3] 03
b) Explain the applications of GTSP Web Interface (GWI)? [5;3] 02
c) Describe the objectives of INCOIS. [2;3] 03
d) Justify the significance of software ‘R’ in operational oceanography. [5;5] 02
- Q.7 a) What is ASCII format of data? Construct the binary code for the word ‘BAY’. [2,5;5] 1+3 = 04
b) Differentiate between NetCDF and ASCII data format. [4;4] 03
c) What is metadata? Explain the necessity of metadata in ocean study? [1,5; 4,5] 03
- Q.8 a) What is ODV? Outline the data formats widely used in ODV systems. [1,2 ; 6] 1+2 = 03
b) What is SeaDAS? Discuss the features of SeaDAS. [2,6 ; 6] 1+3 = 04
c) Identify the satellite missions that does SeaDAS cover? [3;6] 03