Roll No…….. **Total No. of Printed Pages: [01]**
Total No. of Questions: [09]

B. Tech Civil Engg. (Semester – 8th)
PORT AND HARBOUR ENGINEERING
Subject Code: BCIED1862
Paper ID: [19110748]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) What are the advantages and disadvantages of water transportation?
b) Explain the historical development of water transportation in India.
c) What are the modern trends in water transportation?
d) Define tides and explain their characteristics and effects on marine structures.
e) Discuss the functions and types of breakwaters in marine structures.
f) What are the key elements of a good harbour? How is the size of a harbour determined?
g) Differentiate between wet docks, repair docks, lift docks, floating docks, and slipways.
h) Describe the classification of harbours and the factors involved in selecting a suitable harbour site.
i) What are the various types of dredgers and their uses in dredging works?
j) Explain the necessity of navigation aids and differentiate between fixed and floating navigation aids.

Section – B **(5 marks each)**

Q2. Discuss the design principles and functions of breakwaters in marine structures. How do breakwaters mitigate wave actions and protect harbours?

Q3. Explain the planning considerations and selection criteria for the development of harbours. How do ship characteristics influence the design and size of a harbour?

Q4. Compare and contrast the various types of docks used in maritime infrastructure, including harbour docks, wet docks, repair docks, lift docks, and floating docks.

Q5. Dredging plays a crucial role in maintaining navigable waterways. Discuss the classification of dredging works and elaborate on the types of dredgers used in these operations.

Q6. Navigation aids are essential for safe maritime navigation. Describe the different types of navigation aids and their significance in ensuring safe passage for vessels.

Section – C **(10 marks each)**

Q7. Harbor development is a multifaceted process involving various considerations. Discuss in detail the factors influencing the selection of a suitable site for harbor construction.

Q8. Marine dredging is a complex operation crucial for maintaining waterway navigability and harbor infrastructure. Elaborate on the classification of dredging works, including the methods employed and the environmental considerations associated with each type.

Q9. Discuss the technological advancements and innovations in navigation aid systems, highlighting their impact on vessel traffic management and accident prevention. Illustrate your arguments with examples of successful implementation and the benefits derived from these advancements in different maritime regions.