Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – December 2023

Programme Name: M Tech (NAOE)

Semester: 1st Semester

Subject Code: PG11T2103

Subject Name: Introduction to Ocean Engineering

Date: 26-12-2023	Max Marks: 60
Duration: 03 Hrs	Pass Marks: 30

General Instructions

(i) All Sections (A, B & C) are to be attempted.
(ii) Options, if any, are specified in respective sections.

Section A:

10 MCQs of 01 Mark Each = 10 Marks

1. The section of the coastal zone between the shoreline and the breaker zone
   a) berm
   b) surf zone
   c) off shore
   d) none

2. EEZ means
   a) Experimental Education zone
   b) Exclusive Education zone
   c) Experimental Economic Zone
   d) Exclusive Economic Zone

3. Identify the wave which having highest wavelength
   a) tsunami
   b) tide
   c) capillary wave
   d) internal wave

4. The largest tidal range can be found in
   a) Gujarat
   b) Andhra Pradesh
   c) Kerala
   d) Tamil Nadu

5. The instrument which measures temperature, salinity and depth
   a) CTD
   b) side scanner
   c) MBT

d) XBT

6. The back – forth oscillation of a standing wave in a lake or ocean basin
   a) tidal bore
   b) seiche
   c) internal wave
   d) sand bar

7. A large structure extending seaward from the shoreline, erected to protect a harbour or inlet from shoaling due to the long-shore drift of Sediment.
   a) Breakwater
   b) Jetty
   c) Seawall
   d) Pile

8. Identify the smallest sediment according to their size
   a) coarse sand
   b) coarse mud
   c) fine sand
   d) fine mud

9. What is the primary cause of vortex-induced vibration in ocean structures?
   a) Wind-induced oscillations
   b) Wave-induced oscillations
   c) Turbulent flow around the structure
   d) Corrosion of materials

10. What type of ocean structures are particularly susceptible to vortex-induced vibration
    a) Fishing boats
    b) Submarines
    c) Fixed offshore platforms
    d) Lighthouses

Section B:

5 out of 7 Questions of 8 Marks Each = 40 Marks

11. Discuss the factors influencing sediment transport along coastal regions. How can we mitigate the impact of sediment transport on marine structures and navigational channels?

12. Explain the key principles of designing breakwaters and what are the environmental implications associated with their construction.

13. Define littoral drift and its significance on coasts. Provide examples of how littoral drift affects coastal erosion and deposition.

14. Describe the major ocean bottom features of the ocean floor including the continental shelf.

15. Explain the causes of tides, the different types of tides, and their importance for coastal navigation.

16. Discuss the CTD (Conductivity, Temperature, and Depth) profiler as a versatile instrument for oceanographic research. Explain how it measures essential ocean parameters and its applications.

17. Provide an overview of buoy systems used for ocean monitoring. Describe the various types and functions of these systems and how they contribute to data collection.

Section C:

1 out of 3 Questions of 10 Marks Each = 10 Marks

18. a) Calculate the energy carried by a wave with a height of 2 meters and a length of 100 meters. The water density is 1000 kg/m^3 and g = 9.81 m/s^2. [5M]

    b) Calculate the transport rate of sediment particles in a river with a flow velocity of 1.5 m/s and a sediment concentration of 0.02 kg/m^3. [5M]

19. List out various offshore structures and explain their design principles and applications in the oil and gas industry.

20. Outline the fundamental design considerations that apply to sea bed anchors, moorings, and submarine pipelines in offshore engineering. Discuss factors such as load capacity, environmental conditions, and materials.