

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – June 2025
Programme Name: B Sc (NS)
Semester: VI
Subject Code: UG21T5602
Subject Name: Naval Architecture Paper 2

Date: 02.06.2025

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section.
- (iii) Tables (Log, Hindship particulars etc) that can be used.
- (iv) Non-scientific programmable calculator may be permitted

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. What is the role of keel blocks in a drydock?
 - a. To absorb water pressure
 - b. To support the weight of the ship
 - c. To prevent sideways movement
 - d. To increase the ship's buoyancy

2. What type of stress is predominant at the neutral axis of a beam subjected to bending?
 - a. Tensile stress
 - b. Compressive stress
 - c. Shear stress
 - d. Torsional stress

3. What happens to the centre of gravity (G) of a ship when it grounds amidships?
 - a. It moves downward
 - b. It remains unchanged
 - c. It moves upwards
 - d. It moves aft

4. As per SOLAS Chapter XII, Regulation 11, which bulk carriers are required to be fitted with a loading instrument (loadicator).

- a. 150 meters or more in length
- b. less than 150 meters in length
- c. 100 meters or more in length
- d. less than 100 meters in length

5. What type of bending occurs when a ship is supported more by buoyancy amidships than at the ends?

- a. Hogging
- b. Sagging
- c. Torsional bending
- d. Lateral bending

6. How does an increase in ship length generally affect the bending moment?

- a. It has no effect on the bending moment
- b. It decreases the bending moment
- c. It increases the bending moment
- d. It only affects the shear force, not the bending moment

7. What type of corrosion is most common in pipelines and ship hulls due to continuous exposure to moving fluids?

- a. Crevice Corrosion
- b. Erosion Corrosion
- c. Pitting Corrosion
- d. Stress Corrosion

8. What type of anodes are commonly used in sacrificial anode cathodic protection?

- a. Zinc, aluminium, and magnesium anodes
- b. Copper and lead anodes
- c. Steel and iron anodes
- d. Nickel and chromium anodes

9. What is the role of anti-fouling coatings in corrosion prevention?

- a. They reduce the ship's weight
- b. They prevent marine organism growth, reducing corrosion risks
- c. They improve the ship's visibility in water
- d. They make the ship resistant to high temperature

10. Which of the following best describes a fully autonomous ship?

- a. A ship that operates with minimal crew involvement
- b. A ship that is remotely controlled from shore
- c. A ship that makes all navigational and operational decisions without human intervention
- d. A ship that has on board crew for emergency operations only

Section B

Five Questions of 02 Marks each

11. What is critical period during docking of a ship?
12. List the documents provided on ships for loading instrument (loadicator)
13. Define Margin Line.
14. Write any two negative effects of increase in freeboard of a ship.
15. What is full form of IACS? Name any three classification Society.

Section C

Five Questions of 10 Marks each.

16. A ship of 4000 tonnes displacement, 126 m long, has $KM = 6.7$ m, $KG = 6.1$ m. The centre of floatation is 3 m aft of amidships, $MCTC = 120$ tonnes m. Find the maximum trim at which the ship may enter a drydock if the minimum GM at the critical instant is to be 0.3 m. (10 Marks)
17. A box shaped barge is 40 m long and has light displacement 200 t. It has four identical holds into which cargo is loaded as follows:
No.1 Hold- 100 t, No.2 Hold-300 t, No.3 Hold- 300t and No.4 Hold- 100 t.
Calculate and plot Shear Forces and bending Moments at every 5 m distance. (10 Marks)
- 18 a. Describe how to conduct an Inclining Experiment. (5 marks)
- 18 b. Explain passenger ships' ability to withstand flooding of adjacent compartments. (5 marks)
- 19 a. Explain how the Certificate of Class is issued to the ships. (5 Marks)
- 19 b. What are the special features of the Enhanced Survey Program and how it is conducted? (5 Marks)
- 20 a. Describe Bimetallic Corrosion (Galvanic Corrosion) with the help of a suitable sketch. (5 Marks)
- 20 b. Describe the function and working of sacrificial anodes used on ships for corrosion protection. (5 Marks)

