India2n Maritime University

(A Central University, Govt of India)

Supplementary Examinations – March/April 2025

Programme Name: B Sc (NS)

Semester: V

Subject Code: UG21T5502

Subject Name: NAVAL ARCHITECTURE PAPER - I

Date: 03.04.2025	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 sections.

Section A

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

1.If the forward draft of a vessel is 7.0, aft draft 8.0, midship draft 7.40; the vessel is said to be
A. Hogged
B. Sagged
C. Even Keel
D. Excessively stressed

2 The second moment of area can be used to find _____.

A. Area of water plane
B. Underwater Volume of the ship
C. TPC
D. BM of the ship

3. The center of pressure of a plane vertical rectangular surface of height "h" is at --------- of the height of the immersed surface measured from liquid level.

A. h/4
B. h/2
C. 2h/3
D. 3h/4

4.The formula of Moment of inertia of a Triangle about an axis passing through its geometric centre is:
A. $BH^2/36$
B. $BH^3/36$
C.$BH^4/36$
D.$BH^5/36$

5. Due to midship compartment bilging of a box-shaped vessel, her draft will increase and the centre of buoyancy of the vessel will shift leading to ----

A. Greater KB
B. Smaller KB
C. No change in KB
D. No change in KM

6.The process of assembly of large subsections of ships in separate workshops which are later brought together and welded is called:
A. Casting
B. Automatic Welding
C. Prefabrication
D. Plate preparation

7.The turning circle of the ship is calculated during:
A. Design
B. Sea Trial
C. By the Master
D. By Classification Society

8. Racking and Torsion are mainly due to----------

A. Transverse Stress
B. Local Stress
C. Longitudinal Shear Force
D. Bending Stress

9.What is a semi-ordinate in Simpson's rules:
A. The max dimension of a waterplane area
B. The perpendicular distances between the axis and the curve
C. Equal interval
D. Simpsons multipliers

10. Which ships are generally B60 or B100 with a low freeboard because of the large effective length of the superstructure

A. Ro-Ro Ships
B. Bulk carriers
C. Large Oil tankers
D. Large Chemical tankers

Section B

Five Questions of 02 Marks each

11.Enlist the various dynamic stresses experienced by the vessel.
12. What is a General Arrangement Plan?
13.Explain The Theorem of Parallel Axes with a sketch.
14. Explain Drydocking stresses.
15.What are the Simpsons multipliers for Simpson's second rule; also give the value of K for the Simpsons second rule.

Section C

All five questions to be answered (Each 10 Marks)

16a. A box-shaped vessel 40m X 6m is floating in salt water at an even keel draft of 2m with a GM of 0.6m. An empty compartment at midship 10m long and 6m wide is bilged. Find the GM before and after the Bilging. (7 Marks)

16b. List the actions to be taken in the event of partial loss of intact buoyancy. (3 Marks)

17.Calculate the area and the position of COF of a ship's water plane whose half breadths at 10 m intervals from aft are: 0,6,8,8.5,8.5,7.5,6.5,4.5,2.5 and 0.

18. What is the significance of the Sea- trial? Explain in detail the various parameters?

19a. Describe any 5 principles you will consider in designing the ship. (5 marks)

19b. Briefly explain any 3 methods used for launching ships. (5 marks)

20a. What are the key factors contributing to torsional stresses on a container ship? What measures are taken to minimise the effect of these stresses? (5 marks)

20b. Sketch and label a membrane tank. (5 marks)