Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – December 2024

Programme Name: B Sc (NS)

Semester: V

Subject Code: UG21T5502

Subject Name: NAVAL ARCHITECTURE PAPER - I

Date: 09.12.2024	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
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.Racking stresses are caused due to
A. Uneven loading
B. Liquids moving inside the tanks
C. Beam Seas
D. Following seas

4. 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

5.The plan that defines the form of a ship by measuring the outline of parallel planes which are made to pass through the hull at regular intervals is called:

A. Capacity plan
B. General arrangement plan
C. Lines Plan
D. LSA/FFA plan

6. Loss of buoyancy/ volume lost due to bilging will not depend on _____.

a. Length of compartment
b. Breadth of compartment
c. Permeability of compartment
d. Density of water the ship is floating in

7.The turning circle of the ship is calculated during:
A. Design of the structure
B. Sea Trial of vessel
C. construction of hull
D. delivery of the vessel

8. Racking stresses can be compensated through ----------

a. girders
b. bulkheads
c. longitudinal
d. stiffeners

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. Various tests including water tightness, operations, stability, and sea trials are part of ----------

a. Preliminary design
b. Contract design
c. Detail/build design
d. Class Notation

Section B

Five Questions of 02 Marks each

11. List the types of Gas carriers as per the IGC Code.

12. What is a Body Plan?
13.Explain The Theorem of Parallel Axes with a sketch.
14. Explain Drydocking stresses.
15. A box shaped vessel is 100 m long, 12m wide, floating at a even keel draft of 6.0m. in SW. It has an empty midship compartment of 10m long, 8m wide on the centre line of the ship. It has a water tight flat at 6.5 m height from the keel. Find the new draft if the compartment below the WT flat is bilged.

Section C

All five questions to be answered (Each 10 Marks)

16. 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.

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.

18a. Describe any 5 principles you will consider in designing the ship. (5 marks)

18b. Briefly explain any 3 methods used for launching ships. (5 marks)

19. Find the thrust and KP (height of the COP above the bottom) of a vertical bulkhead which is rectangular in shape with a Breadth of 16 m, height 10 m and which is filled up with SW to a Sounding of 6.0 m

20. Draw midship sections of following vessels describing their strength and construction:

a) - Ro Ro vessel 5 Marks
b) - Fully refrigerated LPG carrier 5 Marks