Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – December 2023

Programme Name: B Sc (NS)

Semester: V

Subject Code: UG21T5502

Subject Name: NAVAL ARCHITECTURE PAPER - I

Date: 06.12.2023	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions

(i) All questions from each Section (A, B & C) are compulsory
(ii) Section-A contains 10 questions each carrying 1 mark
(iii) Section-B contains 5 questions, each carrying 2 mark
(iv) Section-C contains 5 questions, each carrying 10 mark
(v) Scientific calculator can be used.

Section A

Fill in the Blanks /State True or False /Choose the correct answer as applicable

1. The second moment of an element of an area (Moment of Inertia) about an axis is equal to the product of the _____.
2. The effort taken to turn a balanced /semi balanced rudder will be _____ compared to the effort required to turn an unbalanced rudder, on its pivotal axis.
3. The pressure intensity in a homogeneous liquid at rest under gravity _____ uniformly with depth.
4. The details of the number and location of fuel oil tanks are obtained from the _____plan.
5. The construction of individual sections of the ship's structure prior to erection is called _____.

6.While bilging of a compartment, Permeability = ...

7. To resist "Racking" stresses
   (a) Longitudinals are placed
   (b) Stringers are placed
   (c) Brackets, Beam knees are placed
   (d) Frames are placed

8. Location of a plate, on a ship can be found in
   (a) Docking plan
   (b) Body plan
   (c) Shell expansion plan

(d) General arrangement plan

9. In order to reduce pounding effect
   (a) Astern region of the ship is Strengthened
   (b) Forward region of the ship is Strengthened
   (c) Segregated ballast tanks are provided
   (d) Double bottom tanks are provided

10. Still water Sagging moment is caused due to
   a) wave trough
   b) More weight loaded at centre
   c) wave crest
   d) More weight loaded at F&A

Section B

11. Explain The Theorem of Parallel axes with a sketch. **(2 marks)**
12. What is Centre of Pressure? Where will be the centre of pressure on a rectangular transverse bulkhead whose breadth is 15 metres and depth is 12 metres, when the tank is full? **(2 marks)**
13. What is bilging? How does it affect various parameters of the ship? **(2 marks)**
14. What is design spiral? Name the different stages of ship design? **(2 marks)**
15. Discuss "Panting" of a vessel. **(2 marks)**

Section C

Five Questions of 10 Marks each.

16.a) The length of a ship's water-plane area is 70 m. The lengths of the equidistantly spaced half ordinates commencing from forward are 0, 5.2, 6.4, 7.0, 6.0, 4.9, 0.3. Find the area of the water-plane & TPC at this draft. **(5 marks)**

b) A ship is floating upright on an even keel at 8.0 m draft F and A. The areas of the water-planes are as follows:

Draft(m)	0	1	2	3	4	5	6	7	8
Area(m^2)	4800	5500	6100	6200	6400	6400	6400	6400	6400

Find the ship's KB at this draft **(5 marks)**

17) What are the different Ship Launching systems for a newly build ship and explain the procedure? **(10 marks)**

18) What is sea trial? What all tests are carried out during sea trial? **(10 marks)**

19 a) What are the different stresses acting on the ship's structure while in port & while at sea? How are they caused? **(6 marks)**

19 b) Explain the sequence of events in ship construction **(4 marks)**

20 a) What is Torsional stress? How does it affect & how is it dealt with on container ships with very large hatch openings / or no hatch covers? **(5 marks)**

20 b) Draw midship section of a fully refrigerated LPG carrier. **(5 marks)**