

**Indian Maritime University**  
**(A Central University, Govt of India)**

**Supplementary Examinations– March / April 2024**

**Programme Name: B Sc (NS)**

**Semester: V**

**Subject Code: UG21T5502**

**Subject Name: NAVAL ARCHITECTURE PAPER - I**

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Date: 03.04.2024

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

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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. For finding the longitudinal BM, the second moment of area about the transverse axis passing through the \_\_\_\_\_ and underwater volume is required.
2. Moment of inertia of rectangular water plane is identified by .  
a)  $LB^3/12$  (b)  $L^3B/12$  (c)  $LB^3/3$  (d)  $3h/8$ .
3. Bilging is caused due to damage to the hull below the \_\_\_\_\_.
4. The details of the number and location of fuel oil tanks are obtained from the \_\_\_\_\_ plan.
5. Unit of second moment of area  
(a)  $M^4$  (b)  $M^3$  (c)  $TM$  (d)  $TM^4$
6. While bilging of a compartment, Permeability = .....
7. The shear force at the cross-section of a beam may also be defined as the unbalanced \_\_\_\_\_ force to the left or right of the section
8. Percentage of permeability is equal to  
(a)  $p\% = (BS/SF) * 100$  (b)  $p\% = (SF/BS) * 100$  (c)  $BS * SF / 100$   
(d)  $BS * SF * 0.6 / 100$

9. State TRUE or FALSE : During bilging of an end compartment COB of the ship moves longitudinally away from the bilged compartment

(a) True (b) False

10. The objective of the inclining experiment is to find the \_\_\_\_\_ KG of the ship.

### **Section B**

11. Write short notes on critical period.

**(2 marks)**

12. Define centre of pressure.

**(2 marks)**

13. What is bilging? How does it affect various parameters of the ship?

**(2 marks)**

14. Write short notes on Loadicator **(2 marks)**

15. Define bending moment.

**(2 marks)**

### **Section C**

Five Questions of 10 Marks each.

16a. A ship's waterplane is 120 m long. The half ordinates commencing from forward at equidistant are 0, 3.7, 7.6, 7.6, 7.5, 4.6 and 0.1 m respectively. Calculate 2<sup>nd</sup> moment of area about the transverse axis passing through the centre of flotation.

**(7 Marks)**

16b. List the effect of bilging on ship's stability.

**(3 Marks)**

17. Answer the following

(a) Explain Simpson rule 2 and its applications on shipping ( 5 Marks )

(a) Explain theorem of parallel axis with suitable diagram ( 5 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)**

20a. State the procedure of the inclining experiment.

**(5 Marks)**

20b. How does a loadicator help the cargo officer.

**(5 Marks)**