

**INDIAN MARITIME UNIVERSITY**  
(A Central University, Government of India)  
**End Semester Examination Dec 2019/Jan 2020**  
**B.Tech (Marine Engineering)**  
**Semester -V**  
**UG11T1506/T2506 – Naval Architecture - I**

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Date: 20.12.2019  
Time: 3 Hours

Max Marks: 70  
Pass Marks: 35

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**PART – A (Compulsory)**

(10 X 2 = 20 Marks)

**Answer ALL Questions**

1. What is Block Co-efficient?
2. What is Gross Tonnage?
3. Define – Angle of Loll.
4. What is TPC 1?
5. Define – Metacentric Height.
6. What do you understand by the term 'Bilging'?
7. Define- Free Surface Effect.
8. What is LCB?
9. Define- Admiralty Co-efficient
10. What is Centre of Flootation?

**PART – B**

(5X10 =50 Marks)

**Answer any FIVE questions from the following**

11. The immersed cross-sectional areas through a ship 180 m long, at equal intervals, are 5, 118, 233, 291, 303, 304, 304, 302, 283, 171 and 0 m<sup>2</sup> respectively. Calculate the displacement of the ship in sea water of 1.025 tonne/m<sup>3</sup>.
12. A ship 135 m long, 18 m beam and 7.6 m draught has a displacement of 14 000 tonne. The area of the load water plane is 1925 m<sup>2</sup> and the area of the immersed midship section 130 m<sup>2</sup> Calculate (a) C<sub>w</sub> (b) C<sub>m</sub> (c) C<sub>b</sub> (d) C<sub>p</sub>.

13. A ship of 4000 tonne displacement has its centre of gravity 1.5 m aft of midships and 4 m above the keel. 200 tonne of cargo are now added 45 m forward of midships and 12 m above the keel. Calculate the new position of the centre of gravity.
14. A vessel of constant triangular cross-section has a depth of 12 m and a breadth at the deck of 15 m. Calculate the draught at which the vessel will become unstable if the centre of gravity is 6.675 m above the keel.
15. A 6 m model of a ship has a wetted surface area of  $8 \text{ m}^2$ . When towed at a speed of 3 knots in fresh water the total resistance is found to be 38 N. If the ship is 130 m long, calculate the effective power at the corresponding speed. Take  $n = 1.825$  and calculate  $f$  from the formula. SCF is 1.15
16. A vessel displacing 8000 tonnes in salt water has a DB tank 22 m long and 15 m wide, partly full of sea water. If the ship's KM is 7 m and KG is 6 m, calculate the effective GM.
17. A ship of displacement 5000t is 80m long and floats at a draught of 4.2m fwd and 4.5m aft. A load of 150t is moved in an aft direction through a distance of 22m. Calculate the new draught at fwd and aft.  
Where LCF is 1.5m aft of midship and GML is 75m.