

# INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

## END SEMESTER EXAMINATION December 2017

**Programme:** B. Sc. Nautical Science

**Semester:** 3

**Subject Name:** Ship Stability Paper 1 **Subject Code:** UG 21 T 3302

**Date:** 06.12.2017

**Maximum Marks:** 70

**Time:** 3 Hours

**Pass Marks:** 35

---

### **NOTE:**

1. Questions of Part 'A' are compulsory and carry 2 marks each. Attempt any 5 from Part 'B'.
2. Sketches should be neat, labelled and in pencil.
3. Marks will be deducted if sketches are not drawn.
3. Assume suitable data where necessary.
4. Marks will be deducted for spelling mistakes and incorrect English.
5. All components of a question must be answered together.

### **PART – A**

Marks: 10X2=20

(All questions are compulsory)

1. (a) Explain Free Surface Moment  
(b) Explain Dock Water Allowance  
(c) Define Block Co-efficient  
(d) Define GM (Fluid)  
(e) Draw a neat sketch to show Unstable Equilibrium.
2. (a) Differentiate between Heel and List.  
(b) Define Angle of Loll.  
(c) Draw neat sketches to show how the Center of Gravity of a ship moves while a weight is shifted on board.  
(d) Write a short note on Virtual Loss of GM.  
(e) Define Reserve Buoyancy.

**PART – B**

Marks:5X10=50

(Answer any 5 of the following)

3. With the aid of suitable sketches, describe the effect of slack tanks on a ship's stability.
4. With the help of a diagram, explain "angle of loll" and the corrective action to be taken at angle of loll.
5. A ship has a summer freeboard of 4.2m. which corresponds to a draft of 8.9m and a displacement of 16020mt. Her TPC is 22.5mt. The ship is floating in water of RD 1.010 in tropical zone with the present freeboards of 4.4m on the starboard side and 4.3m on the port side. It is estimated that the ship will consume 60mt of fuel, 10mt of diesel and 5mt of freshwater on her passage down river to the berth. Find the maximum amount of cargo she can load at the berth in this seasonal zone.
6. M.V."Hindship", KG 5.4m is presently floating in dock water of RD 1.015 with her winter loadline 3cm below the water line. Find the quantity of cargo to load if she has to float at her summer draft in salt water.
7. M.V. "Hindship" in above question. If 200mt of the cargo is loaded in No.2 Tween deck, 4m off the centreline to starboard and the balance in No.3 Tween deck, 6m off the centreline to port, find the resultant list in dock water given the FSM in the final condition is 1200tm.
8. M.V. "Hindship" displacing 12400mt in water of RD 1,010 has a GM Fluid of 0.68m. FSM 1530tm. She loads 620mt in No.2 hold, KG 5.02. No.2 DB tanks P & S which contained 50mt each of SW ballast was pumped out. A 150mt parcel of cargo was shifted from No.2 hold to No.3 Tweendeck. Calculate her final GM Fluid.
9. A ship displacing 9000mt, KM 11.0m, KG 9.7m is listed 4 deg to starboard. She loads 2200mt of cargo with centre of gravity on the centreline. Her final GM is 1.2m. Find the new angle of list. (Assume KM remains the same)

\*\*\*\*\*