INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

End Semester Examination Dec 2019/Jan 2020

B.Sc. (Nautical Science)

Semester -III

UG21T4302- Ship Stability – Paper-I

Date: 11.12.2019 **Max Marks: 70**

Time: 3 Hours **Pass Marks: 35**

Note: Question **No.1 is compulsory.**

Solve any 6 question remaining 7 questions.

Use of M.V. Hindship Stability Particulars booklet and non-programmable Scientific Calculator are permitted.

Q1. Write Short Notes on the following: (5x2=10 marks)

(a) Reserve Buoyancy
(b) Fresh water Allowance
(c) Righting Lever
(d) Free Surface Effect
(e) "List" and "Heel".

Q2. (a) A rectangular log of wood 5m x 1.6m x1.0m weighs 6 t and floats with its larger face horizontal. Find its Drafts in SW. (5 marks)

(b) A box shaped vessel 60m x 10m x 10m floats in DW of RD 1.020 at an even keel Draft of 6m. Find her KB in DW of RD 1.004. (5 marks)

Q3. (a) A box shaped vessel 20x4x2m has a mean Draft of 1.05m in SW. Calculate her Draft in DW of RD1.012. (5 marks)

(b) The Length and Breadth of the water plane of a ship are 100m and 12m. If the Co-efficient of fineness of the water plane is 0.7, find the TPC in SW and in FW in both densities. (5 marks)

Q4. (a) In a vessel of 8800 tonnes displacement and KG 6.2m, 200 tonnes of cargo was loaded in the LH, 1.7m above the keel. Find the final KG. (5 marks)

(b) A vessel is in SW with her summer Loadline 60mm above the water on the port side and 10mm above the water on the Starboard Side. Find the DWT available, if her TPC is 40. (5 marks)

Q5. Write short notes on the following (Sketch where necessary): (2x5=10 marks)

(a) Righting Moment
(b) Unstable Equilibrium

Q6. A Ship has W10, 000 t, KM 7.8m, KG 7.075m, and is upright, No.3 port and Starboard DB Tanks are full of HFO RD 0.95. Each tank is rectangular, 15m long, 12m wide and 2m deep. Calculate the list, when HFO is consumed from No.3 Starboard, until the Sounding is 1.2m in tanks. (10 marks)

Q7. M.V. 'Hindship' floating in Condition No.2, loads 400 tonnes of Cargo in No 1TD and on the voyage, consumes the entire oil in No.2DB Tanks P&S. Calculate GM (Solid and Fluid). Assume change of displacement is negligible, and also assume FSC constant. (10 marks)

Q8. M.V. Hindship in condition No.8, consumes the entire HFO form No. 5. DB Tank (S), CG 4 meters from the centerline. Find the resultant List. (10 marks)
