B.Tech. Degree V Semester Examination in Marine Engineering December 2016

MRE 1507 NAVAL ARCHITECTURE I

(2013 Scheme)

Time : 3 Hours   Maximum Marks : 100

$(5 \times 20 = 100)$

I. (a) Describe oil Tankers and Cargo Ships with respect to their method of construction, cargo carried, speed and dead weight ranges.

(b) Draw the general layout of upper deck and E/N room of a Bulk carrier and briefly explain.

OR

II. (a) Briefly explain LNG, LPG Carriers with reference to its design features.

(b) Describe the uses and types of Tugs, Supply Vessels and Dredgers.

III. (a) Describe the method for evaluating following Hydrostatic particulars of Ship (i) Displacement (ii) TPC   (iii) KMt   (iv) KML.

(b) A ship is having L = 140 m, B = 20 m and draft 8 m in sea water of sp. gravity – 1025 t/m^3
Cb = 0.78, TPC = 19 and Cp = 0.83, Find Am, Awp, Cm and Cwp of the ship.

OR

IV. (a) A ship of length 160 m and breadth = 24 m has the following half ordinates on the water plane

Station	AP	1	2	3	4	5	6	7	8	9	FP
Half ord (m)	3.5	7.6	8.5	11.4	11.6	11.6	11.5	10.4	8.5	4.2	0

Calculate (i) area of water plane (ii) Centroid   (iii) Cwp)

(b) A ship of length 130 m has a light ship displacement of 4800 t with an LCG of 0.5 m aft of mid ships. Loading done as follows :

Load	Mass(t)	LCG from mid ship
Cargo	3400	38.0 m fwd
Cargo	4000	30.0 m aft
Oil fuel	640	14.5 m fwd
FW	100	55.0 m fwd
Stores	60	35.0 m aft

Find the final displacement and LCG from mid-ship

V. (a) Explain the need for conducting inclining – experiment. Give a brief description about the test carried on a Ship.

(b) An inclining experiment was carried out on a Ship of 8000 t displacement. A mass of 6 t moved horizontally by 20 meters across causing a pendulum of 10 m long to deflect 100 mm. KMt value from Hydrostatic particulars is   8 m. Find Metacentric height and KG of the Ship.

OR

VI. (a) What do you mean by corresponding values? Write down the relationship for speed, wetted surface area and displacement for the Ship and Model.

(b) A rectangular Barge of $100\ m \times 20\ m \times 12\ m$ has a wetted surface area equals to 2800 m^2. A similar Barge of 2100 m^2 wetted surface area is to be constructed. Find out the dimensions of the new barge.

VII. (a) Define Trim, Hydrostatic draft, Trim aft and Trim fwd and MCT1 cm.

(b) A ship of length of 140 m and displacement 10,000 t has its L.C.F.3 m aft of mid-ships. Ship is at an even keel of 5 m. Find the final drafts when a load of 100 t on board is shifted by 20 m aft. MCT1 cm is given as 140 tm.

OR

VIII. (a) Explain how the statical stability curve is prepared for a particular displacement from the cross curves given in the trim and stability booklet.

(b) 'GZ' values at 9,000t displacement taken from Cross curves (assumed KG of 5 m) for a Ship are given under
Angle : 0   15   30   45   60   75   90
GZ   00.15   0.320.440.44   0.34   -0.015 ----- Actual KG = 4.5 m.
KMt = 5.45 m.   Prepare the statical stability curve.

IX. 'KN' values from Cross curves of a ship corresponding to Displacement = 10,500 t are given under

Angle	0	15	30	45	60	75	90
KN (m)	0	1.85	3.7	5.43	6.57	7.08	6.8

KG Value is 6.90 m, KMt = 8.3 m
   (i)   Construct the statical stability curve.
   (ii) Find Range of Stability, Value of Max Righting lever, Maximum Righting moment.

OR

X. (a) Define Admiralty Coefficient and Fuel oil coefficient and explain its uses.

(b) Model test conducted on a 125 m length Ship having service speed of 16 kn with a model of length = 5m gave Rtm of 36 N while running at the corresponding speed. Other details are Ss = 5000 m^2, fm = .515, fs = .423. Find RTs and EHP.

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