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

MRE 507 NAVAL ARCHITECTURE I

(Prior to 2013 scheme)

Time : 3 Hours

Maximum Marks : 100

(5 × 20 = 100)

- I. (a) Describe bulk carriers and containers with neat sketches.
(b) Describe the purpose of periodical survey in ships.

OR

- II. (a) Explain the role and functions of Classification Society for ship construction and service.
(b) What are LNG and LPG carriers? Explain their importance in global market.

- III. (a) Explain the terms C_b , C_p , C_m , C_{wp} and A_m with suitable sketches.
(b) A ship has following data: $LB_p = 180$ m, breadth = 20 m, draft = 7 m in SW of 1.025 t/m^3 , $C_b = 0.83$, $C_{wp} = 0.93$, $C_m = 0.94$ and $GML = 105$ m. Find the following:

(i) TPC (ii) Displacement (iii) $MCT1cm$

OR

- IV. (a) A ship of 5000t displacement and 100 m long floats at a draft of 6 m in sea water of density 1025 Kg/m^3 . Estimate wetted surface area of the ship by: (i) Denny's formulae (ii) Taylor's formulae with $c = 2.6$
(b) Water plain area of a ship of 140 m length and breadth 20 m is defined as follows:

Station	AP	1	2	3	4	5	6	7	8	9	FP
Half Ord(m)	2.5	6.4	8.5	9.4	9.6	9.6	9.5	8.4	6.5	3.2	0

Calculate (i) area of water plane (ii) centroid (iii) C_{wp}

- V. (a) Explain Trim, $MCT1 \text{ cm}$, TPC and Hydrostatic draft.
(b) (i) Using Froude's formulae calculate the frictional resistance of a ship at 15 kn speed. Other details: $S = 5000 \text{ M}^2$, $f = 0.422$ and $n = 1.825$.
(ii) If the residual resistance equals to 0.8 times of frictional resistance, calculate EHP of the ship.

OR

- VI. (a) What are the various types of resistances acting on a ship? Briefly explain.
(b) A ship consumes 400 T of fuel at 16 Kn speed on the onward journey and returned at 14 Kn speed.
(i) Find the saving in fuel consumption.
(ii) Find the speed at which the ship has to run to halve the fuel consumption, ie. 200t.

- VII. (a) Define floodable length and permeability.
 (b) A box barge of 20 m length and 8 m breadth floats at an even draft of 3 m has a compartment of 5 m in length in the middle. Calculate the new draft in this compartment is got Bilged (i) with permeability = 100% (ii) with permeability = 75%

OR

- VIII. A box barge 100 m length and 8 m beam floats at an even keel draught of 5 m in sea water. Center of gravity is at 2.6 m above keel. The empty compartment at the fore-end having 4 m length is got Bilged. Find the end draughts.

- IX. A ship having the following details:
 Light weight = 6000t, KG = 10m, KMt = 16.5 m, KML = 102 m.

Following cargo operations carried out:

Cargo wt (t)	CG (m)	Operation
2000	3.0	Loaded
1000	4.0	Loaded
700	8.0	Loaded
800	0.6	Unloaded

If KMt = 16.5 m and KML = 102 m in the loaded condition, find the final displacement GM and MCT1 cm.

OR

- X. (a) Explain statical stability and dynamic stability of a ship. Describe how the preparation of them using “cross curves of stability”.
 (b) Details of inclining experiment done on a ship are: Light weight = 8000t. A load of 5t moved horizontally gave 50 mm deflection in a pendulum having 8 m length. KMt = 12.5 m. Calculate the metacentric height and KG.