INDIAN MARITIME UNIVERSITY

(A Central University, Govt.of India)

May/June 2015 End Semester Examinations

SEMESTER – V, B.TECH (MARINE ENGINEERING)

NAVAL ARCHITECTURE - I (T 1506)

Date:22.06.2015 **Max.Marks:100**
Time:-3 Hrs **Pass Marks:50**

NOTE:- 1) NON-PROGRAMMABLE SCIENTIFIC CALCULATOR IS ALLOWED.
2) QUESTION NO. 1 IS COMPULSORY.

PART – A **(3 x10 = 30 Marks)**

(Compulsory Questions)

1. a) Distinguish between Light Displacement and Dead Weight of a ship

   b) With respect to transverse stability of a ship, what is meant by Free surface Effect and how such effect can be reduced?

   c) State the difference between Wetted Surface Area and Water Plane Area of a ship.

   d) With reference to the flooding of a ship's compartment , what is meant by Bulkhead Deck and Margin Line?

   e) What are the components of Total resistance of a ship, when she is moving through the water.

   f) What is the purpose of inclining experiment of a ship and state as to when it is carried out?

   g) State the relationship between TPC and Water plane area.

   h) What is the significance of 'GM' for a stable ship, Stiff Ship and Tender Ship?

   i) State the effect of Bilging of a Compartment of a ship.

   j) What is meant by SFC of an engine and draw a typical graph of SFC versus Speed of a ship

PART – B (5 x14 = 70 Marks)

(Answer any five of the following)

2. A ship of 12000 tonne displacement has a metacentric height of 0.6m and a centre of buoyancy of 4.5 m above the keel.The second moment of area of the water plane about the centre line is 42.5x1000 m^4. Calculate the height of centre of gravity above the keel.

3. A double bottom tank is filled with sea water to the top of the air pipe. The pressure on the outer bottom is found t o be 1.20 bar, while the pressure on the inner bottom is found to be 1.05 bar. Calculate the height of the air pipe above the inner bottom.& the height of the D.B. Tank.

4. A 6 m. model of a ship has a surface area of 7 m^2 and when towed in sea water at 3 knots has a total resistance of 35.875 N. Calculate the effective power of the ship, 120 m. length, at corresponding speed. Given that ,n=1.825, SCF=1.15, model f in sw=0.5042, ship f=0.4322.

5. A ship 180m long has half widths of waterplane of 1 ,7.5, 12, 13.5, 14, 14, 14, 13.5, 12, 7, and 0m respectively. Calculate:-i) waterplane area, ii) TPC, iii) Waterplane area coefficient.

6. A ship of 15000 tonne displacement floats at a draught of 7 metres in water of 1.000t/cub. Metre. It is required to load the maximum amount of oil to give the ship a draught of 7.0 metre in sea water ofdensity 1.025 t/cub.metre. If the waterplane area is 2150 square metre, calculate the mass of oil required.

7. The normal speed of a ship is 14 knots and the fuel consumption per hour is given by 0.12+0.001 v^3tonne, with V in knots, Calculate:- i) the total fuel consumption over a voyage of 1700 nautical miles, ii) the speed at which the vessel must travel to save 10 tonnes of fuel per day.

8. An inclining experiment was carried out on a ship of 8000tonnedisplacement . A mass of 10 tonnes was moved 14 m. across the deck causing a pendulum 8.5 m long to deflect 110mm. The transverse metacenter was 7.15 m above keel. Calculate the metacentric height and the height of centre of gravity above the keel.

9. A ship 150 m long floats at draughts of 8.20 m Forward and 8.9 m Aft.. MCT 1 cm 260 tonne-m,TPC 28 and LCF 1.5m Aft of midship. It is necessary to bring the ship to an even keel and a double bottom tank 60 m forward of midships is available. Calculate the mass of water required and the final draughts.

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