

INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

END SEMESTER EXAMINATION JUL 2019

B.Tech (Marine Engineering)

Semester V

Naval Architecture – I

(UG11T1506 / UG11T2506)

Date: 22-07-2019

Time: 3 Hours

Maximum Marks: 100

Pass Marks: 50

PART- A

(All Questions are compulsory)

Marks: 10 x 3 =30

Q.1 Briefly explain the following -

- (a) Prismatic coefficient
- (b) Angle of loll
- (c) Righting lever
- (d) Admiralty coefficient
- (e) MCT 1cm
- (f) Factors affecting frictional resistance
- (g) Metacentric height
- (h) Free surface effect
- (i) Reserve of buoyancy
- (j) Dead weight, lightship weight and displacement

Part – B

Marks: 5 x 14 =70

(Answer any 5 of the following)

Q.2(a) The half widths of a ship's water plane 210m long and at equal interval are:

0.5, 10, 13.6, 16, 15.5, 13, and 2m

Calculate the TPC in salt water and the water plane coefficient.

(7 Marks)

(b) What is curve of statical stability? What are its important features?

How can you find the metacentric height from it?

(7 Marks)

Q.3 (a) A vessel displacing 5800 tonnesKG 7.0mKG 6.0m has to load a quantity of deck cargo KG11.0m. What is the maximum quantity that she can load so that her GM is not less than 0.75 m.

(7 Marks)

(b) A box barge 50m long, 10m wide and 5m deep, floats on an even keel draught of 2.5m in sea water. Calculate the new draught when a central watertight compartment 10m long and the full width and depth of the barge is bilged. State the amount of remaining freeboard.

(7 Marks)

Q.4(a) What is the purpose of inclining experiment? How is it performed?
What precautions are to be taken? (10 Marks)

(b) A ship displaces 12500 t and has an initial KG of 6.5 m. Calculate the final KG if 1000 t of cargo is loaded into the lower hold at KG 3.0 m. (4 Marks)

Q.5(a) A vessel of 6500 tonnes displacement has a KM 7.2m and KG 6.8m. A weight of 100 tonnes is shifted 2.3m to port and 3.9m upwards. If the vessel is initially upright, calculate the resulting list. (7 Marks)

(b) What are various types of ship equilibriums? Describe them briefly. (7 Marks)

Q.6 (a) A vessel displacing 8000 tonnes in salt water has a double bottom tank 20 meters long and 16 meters wide, partly full of sea water. If the ship's KM is 7 meters and the KG is 6 meters, calculate the effective GM. (7 Marks)

(b) What is the effect of drydocking on ship's stability? (7 Marks)

Q.7 A ship of displacement 4000t is 76m long and floats at a draught of 3.66m forward and 3.82m aft. A load of 100t is moved in an aft direction through a distance of 25m.

The following hydrostatics particulars may be assumed to remain constant:

LCF=1.5m aft of midships: GML=72.2m:

Calculate the new draughts forward and aft. (14 Marks)

Q.8 (a) What is Froude's law of comparison? How is it used to determine ship resistance? (7 Marks)

(b) The residuary resistance of a model 7 m long is 20 N when towed at $3\frac{1}{2}$ knots. Calculate the power required to overcome the residuary resistance of a similar ship 140 m long at its corresponding speed. (7 Marks)
