

INDIAN MARITIME UNIVERSITY
(A Central University Government of India)
END SEMESTER EXAMINATIONS – DECEMBER 2019
Diploma in Nautical Science
Semester I

UD11T4103- SHIP CONSTRUCTION & SHIP STABILITY – I

Date: 11.12.2019

Max. Marks: 70

Time: 2Hrs

Pass Marks: 35

Note: Part - A: Question no. 1 is compulsory. Answer any 2 out of Remaining 3 questions.

Part – B: Question no. 5 and no. 6 are compulsory. Answer any 2 out of remaining 3 questions.

All Questions carry equal marks.

Use of non-programmable Scientific Calculator are permitted. Graph paper to be provided by Institute, if required.

PART A: SHIP CONSTRUCTION

1. a) Draw a neat profile view of a ship with holds & Tween dk. (5 marks)
b) Label the following parts on the above diagram:
 - Forepeak and After Peak tank (1 marks)
 - Fore mast and main mast (1 marks)
 - Engine Room & steering gear compartment (1 marks)
 - Propeller and Rudder (1 marks)
 - Accommodation and Funnel (1 marks)
2. a) Draw and label a mushroom ventilator found on board (5 marks)
b) Explain the importance of Load lines? What do the following alphabets stand for S, W, T ? (3 marks +2 marks)
3. a) Sketch profile view of Fore Peak tank and label the parts. (5 marks)
b) What do you understand by "statutory freeboard"? Draw the deck line and Load line disc (Plimsoll mark) of a ship and show the statutory freeboard and various dimensions. (2 marks +3 marks)
4. Define and illustrate the following: (5 x 2=10 marks)
 - a) Length Overall
 - b) Forward Perpendicular
 - c) Aft Perpendicular
 - d) Extreme depth
 - e) Base line

PART B: SHIP STABILITY

5. Define the following. Draw sketch if required: (5x2=10 marks)
- (i) Load displacement
 - (ii) Waterplane coefficient (C_w)
 - (iii) FWA
 - (iv) Deadweight aboard
 - (v) TPC
6. A deep tank 10m x 16m x 6m has a cylindrical trunkway on top (axis vertical) Height: 4m Diameter: 6m. Find the mass of oil of RD 0.92 it can hold if a space equal to 2.5% of the volume of the complete tank is to be allowed for expansion. (10 marks)
7. Given data of M.V. "ATLAS".
- | Draft (m) | Displacement (Tonnes) |
|-----------|-----------------------|
| 5.0 | 9800 |
| 6.0 | 12000 |
| 7.0 | 14300 |
| 8.0 | 16600 |
| 9.0 | 20750 |
| 10.0 | 25900 |
- a) Construct a displacement curve to scale using above data. Use given answer sheet only (No graph paper required) (5 marks)
- b) If load draft is 9.40 m and present draft is 6.55 m, find load displacement, present displacement & Deadweight available. (2 + 2 + 1 = 5 marks)
8. a) A box shaped vessel is 100 m long, 14m wide and 10 m height. Her reserve buoyancy % in FW is 30. Calculate her displacement and reserve buoyancy % when she enters SW. (3 + 2 = 5 marks)
- b) Explain how Freeboard is related to reserve buoyancy. (5 marks)
9. A vessel of 12000 t displacement arrives at the mouth of a river, drawing 10.0 m is SW. How much cargo must she discharge so that her draft in an upriver port of RD 1.012 would be 10.0m? (10 marks)
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