

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – June 2023

Programme Name: M Tech (DHE)

Semester: II

Subject Code: PG12T1202

Subject Name: Ship Handling in Ports and Harbours

Date: 29.05.2023	Max Marks: 60
Duration: 03 Hrs	Pass Marks: 30

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. The preferable location for placing the towing hook on the tug boat is
(a) forward (b) midship (c) aft (d) port side
2. The protection provided on the jetty against hull damage is
(a) bollard (b) anchor post (c) chocks (d) fenders
3. The drawing used for dry-docking the ship is
(a) Body plan (b) shell expansion plan (c) docking plan (d) G.A plan
4. What are the vertical forces acting on the ship during docking
(a) weight of the ship (b) residual buoyancy of the hull
(c) keel block upthrust (d) All of the above
5. The critical period during dry-docking is
(a) Ship entering the dock (b) Ship completing resting on blocks
(c) stern just touches the keel blocks (d) Ship floats in the dock
6. The type of dry dock gate working on buoyancy principal is
(a) Vertical gate (b) Flap gate (c) Caisson gate (d) Mitre gate
7. Identify the mooring equipment
(a) Anchor (b) hawser (c) sinker (d) All of the above
8. The methods used for safe manoeuvring of ships in shallow waters
(a) Pilots (b) VTS (c) Tugs (d) All of the above
9. The machinery used to provide the required rudder torque is
(a) Steering gear (b) stern tube (c) stern frame (d) thruster
10. A ship requires some level of maneuverability at low speeds when moving through
(a) Rough weather (b) Approaching harbour channels
(c) In canals (d) All of the above

Section B

Five Questions of 02 Marks each

11. Name two main types of drydocks.
12. List down the shore mooring fittings.
13. Write down the design characteristics of a rotor tug.
14. Name the towing equipment on the towing vessel and towed object.
15. Consider a bulk carrier with breadth 40m, draft 11 m and block coefficient = 0.8, proceeding at 5 knots along a river with breadth 200 m and depth of water 14 m. Determine the magnitude and location of squat.

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16. The resistance of a ship of 10000T displacement is given by $R_T = 0.55V^3$, with R_T in kN and the ship speed V in m/s. The ship is moving with a speed of 8 m/s when the propeller is stopped. Determine the time required for the speed of the ship to reduce by 1 m/s. Assume that the added mass of the ship is 10 percent of the actual mass.
17. Explain course stability and manoeuvres to determine the course stability of the vessel
18. State the IMO Manoeuvring standards for merchant ships of length 100m and above.
19. Write short note on the vessel behaviour near canal or river banks.
20. Explain with illustrations, the purpose and naming of various mooring lines provided on a cargo ship. List down the design considerations for mooring lines.
21. Details of two ship designs A & B are given below:

	Ship A	Ship B
Length, L(m)	215	252.5
Beam, B(m)	24	26.75
Draft, T(m)	7.625	8
Area of rudder, A_R (sq.m)	?	50

Design B achieved a tactical diameter of 4.3 ship lengths at 28 knots. Assuming that tactical diameter = const. $\times L^3T/BA_R$, calculate the rudder areas necessary to give tactical diameters of 4.5, 5.0 and 5.5 ship lengths in design A at the appropriate speed.

22. Two designs possess the following values of derivatives:

	Y_v	N_v	Y_r	N_r
Design A	-0.36	-0.07	0.05	0.06
Design B	-0.26	-0.10	0.04	-0.03

Comment on the directional stability of the two designs.