

Indian Maritime University
June 2022 End Semester Examinations
Programme Name : B Sc (NS)
Subject Name : - SHIP STABILITY PAPER - II
Subject Code : UG21T4402
Max Marks : 70 Pass Marks : 35 Time 3 Hrs
Date – 03.06.2022

Part A is compulsory – 10 MCQs (10 X 01 Mark)

Q.1

- i. To press up all double bottom tanks and lower the center of gravity of a vessel suspected of being in a state of loll, you should first fill:
 - a) The low side of each of the double bottom tanks.
 - b) Both sides of all double bottom tank simultaneously.
 - c) The high side of each of the double bottom tanks.
 - d) The high side of all double bottom tanks simultaneously.

- ii. The initial GM of a ship loading grain should be
 - a) 0.25
 - b) 0.18
 - c) 0.30
 - d) None

- iii. The stability booklet of a ship contains
 - a. Draft
 - b. Displacement
 - c. Kg
 - d. All The Above.

- iv. The aft draft marks of a vessel is more than the forward, then vessel is trimmed by
 - a. Head
 - b. Stern

- c. Even Keel
 - d. None Of the Above
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- v. DOA stands for
 - a. Daily officers' allowance
 - b. Document of authorization
 - c. Document of action
 - d. None
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- vi. Angle of loll can be corrected by
 - a. Jettisoning
 - b. Deballasting
 - c. Ballasting
 - d. All the above.
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- vii. Simpsons rule is used to find
 - a. Area
 - b. Volume
 - c. COG
 - d. All the above
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- viii. Load-line is checked after loading to ensure that a vessel has adequate:
 - a. List
 - b. Freight
 - c. Reserve buoyancy
 - d. Displacement
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- ix. Which one of these is a deck cargo?
 - a. Timber
 - b. Grain
 - c. Coal
 - d. Oil

- x. Equation used to calculate GZ
 - a. $GZ = GM \cdot \tan\theta$
 - b. $GZ = GM \cdot \cos\theta$
 - c. $GZ = GM \cdot \sin\theta$
 - d. $GZ = GM \cdot \cot\theta$

Part B is compulsory – 5 Short Questions (05 X 02 Marks)

Q.2

- i. What is trim? Does a vessel sailing normally have any trim?
- ii. What is center of flotation? Where is its location?
- iii. How does change in density affects trim?
- iv. What is angle of loll? What danger is associated with ship at angle of loll?
- v. Define stiff and tender vessel.

Part C – 7 Long Questions-Answer Any 5 (05 X 10 Marks)

Q.3

A ship left port drawing 8.2 m & 10 m F & A. LBP 160 m, TPC 32, MCTC 220 tm HF 2.4 m aft. Find the arrival drafts F & A if, enroute, it consumed:

420 t HFO from No: 4 DBT (HG 35 m aft)

220 t HFO from No: 7 DBT (HG 60 m aft)

200 t FW from No: 1 DBT (HG 60 m fwd.).

Q.4

- a) Explain moment of statical stability at small angle of heel.
- b) A ship of 4000 t displacement has KG 5.1 m, KB 2.1 m, KM 5.5 m. Find the moment of statical stability when she heels 24 degrees, assuming that she is wall-sided.

Q.5

- a) What all information can be obtained from curve of statical stability?
- b) Explain how does shifting of weight from forward to aft in deck changes trim with the help of a neat diagram.

Q.6

- a) What is Document of Authorization (DOA)?
- b) What are the Intact stability criteria for carrying grain as per grain code?

Q.7

Draft (m)	5	4	3	2	1	0
TPC	22.6	22.2	21.6	20.9	19.7	14.6

Find W and KB at 6 m SW draft. Using Simpsons Method.

Q.8

- a) Differentiate stiff and tender vessel.
- b) What precautions can be taken while carrying deck cargoes?

Q.9

- a) What all remedial action can be taken if a vessel is at angle of loll?
- b) A box-shaped vessel $100 * 12 * 8$ m is lying at an angle of loll of 18 degrees. If the mean draft is 4m, find its KG.