

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2024
Programme Name: Diploma in Nautical Science (DNS)
Semester: II

Subject Code: UD11T5204

Subject Name: Ship Construction and Ship Stability - II

Date: 18.12.2024

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section
- (iii) Use of Non-Programmable Scientific Calculator & M.V. Hind-ship Stability Particulars booklet are permitted.

Section A – MCQs. Answer all.

(10x1=10 Marks).

1. Frame numbers shown in all the plans are numbered from
 - a. Forward to aft
 - b. Aft to forward
 - c. Mid-ships towards forward & aft
 - d. Centreline to port & starboard

2. Centre of Flotation is the geometric centre ofof the ship.
 - a. total volume
 - b. underwater volume
 - c. water plane area
 - d. underwater area

3. Location of International Shore Coupling on board can be found from
 - a. Shell expansion plan
 - b. Lifesaving appliance plan
 - c. Firefighting appliances plan
 - d. General arrangement plan

4. Panting beams are located in
 - a. Double bottom tanks
 - b. Centre Tanks
 - c. Topside Tanks
 - d. Fore and After peak tanks

5. In ships knees connect deck beam to
 - a. Transverse bulkhead
 - b. Hull frame
 - c. stanchion
 - d. Bottom longitudinal

6. What motions of the vessel is the possible cause of racking?
- Heaving
 - Pitching
 - Rolling
 - Yawing
7. On a stiff vessel
- Angle and period of roll is small
 - Angle and period of roll is large
 - Bulk cargo is more likely to shift
 - In case of cargo shift, the list so caused will be large
8. When the height of the metacentre is less than the height of the centre of gravity, the vessel is said to be in
- Stable equilibrium
 - neutral equilibrium
 - unstable equilibrium
 - none of above
9. A vessel trims about
- metacentre
 - centre of gravity
 - centre of flotation
 - centre of gravity
10. Beams are
- Longitudinal strength members on a vessel
 - Strength members only below cross decks
 - Strength members only in the After-peak tank
 - Transverse strength members on a vessel

Section B

Short Answer Questions. Answer all.

(5 x 2 = 10 Marks)

- Explain functions of watertight bulkheads on the ship.
- Pounding.
- Standard steel sections used in ship building
- What is a Loadicator? Name two types data which are required to get information from Loadicator.
- What is 'Heel'? Label a diagram of a mid-ship cross-section of a ship heeled to a small angle to show the weight acting through G and the buoyancy force acting through B

Section C

Long answer questions. Answer all questions

16. M.V. Hind ship at a draft of F 5.38m, A 6.17m, GM (fluid) 0.83m. FSC 0.092m discharges 430 t from No.3 TD and loads 250t in No.5 LTD. 300 t of fuel oil was received equally distributed in No.2 DB tanks (P & S). Calculate her GM (fluid). **(10 marks)**
17. A ship of 8800 tonnes displacement is floating upright and has GM = 0.5 m. A weight of 80 tonnes, already on board, is moved 1.5 m vertically upwards and 6 m transversely to starboard. Find the list. **(10 marks)**
18. **(2 x 5 = 10 Marks)**
a. Sketch and Label a Longitudinally framed double bottom construction
b. what is the purpose of air vent pipe and vent head fitted in a ballast tank. Sketch and label air pipe and vent head to a ballast tank
19. Sketch profile view of a typical double hull tanker and label the following parts:
1. Cargo Tanks 2. Manifold 3. Pump Room/Cofferdam 4. High rise PV valve
5. Permanent ballast tanks (on a plan view) **(10 Marks)**
20. **(2 x 5 = 10 Marks)**
a. A ship of 5000 t displacement has KG=3.7m and KM=5.3m.
The following cargo is then loaded:
2000 t KG=3.7m and 1000t KG=7.5m
Find how much deck cargo (KG=9m) may now be loaded if the ship is to sail with a minimum GM=0.30m
- b. What are the causes and effects of hogging and sagging in a vessel?

-----End of question paper-----

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