

**(Paper Format)**

Duration: 3 hrs.

**SECOND MATE (F.G.)**

Maximum Marks: 200

Pass Marks: 120

**SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

- Note:
1. Questions IN PART- A are compulsory and carry 25 marks each.
  2. Attempt 5 out of 6 questions from Part -B and carry 25 marks each.

**PART A**

1. M.V. HINDSHIP QUESTION ( GZ, LIST) or CALCULATION OF CHANGE IN TRIM DUE TO LOADING, DISCHARGING OR SHIFTING OF A SINGLE WEIGHT/ CALCULATION OF FINAL TRIM, FORWARD AND AFT DRAFTS (USING TRIM TABLES ONLY)
2. CONSTANT DATA QUESTION ON STABILITY.
3. SHIP CONSTRUCTION (SKETCH & LABEL)

**PART B**

4. MARPOL /BALLAST WATER MANAGEMENT
5. SHIP SAFETY/ENVIRONMENT PROTECTION
6. SAFE WORKING PRACTICES/ CHECKLISTS.
7. SHIP CONSTRUCTION THEORY
8. MARITIME LEGISLATION (SOLAS/ ISPS / ISM )
9. LEADERSHIP AND TEAM WORKING SKILLS

Please note that the above format is only an indicative of the examination paper. The candidates are advised to refer to detailed teaching syllabus and the course outline.



**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL  
PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY &  
ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

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**Notes:**

1. Use of M.V. Hindship Hydrostatic tables and non-programmable scientific calculator is allowed.
2. Question in Part – A are compulsory and carry 25 marks each.
3. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M. V. Hindship floating in water of R.D. 1.012 at drafts F: 5.16m A: 6.02m. She pumps out entire SW ballast from No.1 and No.4 (P, C and S), D.B. tanks No.3 (P and S) and No.5 D.B tanks which were empty are filled with empty are filled with H.FO.. Calculate:

- a) Maximum quantity of cargo that can be loaded so that the vessel will be at summer draft on reaching the open sea. Fuel and water consumption for river passage is 70 Tons.
- b) GM (F) in docks if in departure condition KG = 8.75m, FSM = 1450.

**Q.2** A vessel of displacement 16,250T, KG 8.1m, KM 8.7m, needs to discharge a load of 80T from the deck located 3.5m to starboard of centreline and KG 10.2m using her own heavy lift crane, the head of which is 24.6m above keel. Calculate the maximum list during the operation if the crane is expected to reach 14.5m to the port or both on port side.

**Q.3** Draw and label a neat sketch of bilge piping system of a ship.

**PART – B**

**Q.4 a)** Briefly describe the objectives and contents of MARPOL Annex I.

b) List the entries required in Garbage Record book and the duties of the Garbage Control Officer.

**Q.5** Describe the contents and objectives of the Code of Safe Working Practices for Merchant Seamen. Explain Permit to Work systems.

**Q.6** Prepare detailed Risk Assessment for “WORKING ALOFT” as per COSWP for the painting of the funnel; including hazard identification and control measures.

**Q.7** Sketch and define: i) Balanced Rudder                      ii) Rake and Skew of propeller                      iii) Shearing Force

**Q.8 a)** Describe the role of classification societies with regards to survey and certification of ships.

b) Briefly write about the objective of the UNCLOS describing the sea area jurisdiction.

**Q.9** Outline the requirements for Occupational Health, Safety, Operational procedures and Accident Prevention and Reporting under MLC 2006.

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**PART – A**

**Q.1** M.V. Hindship floating at a displacement of 19150t, KG = 6.65m, FSC = 0.042 m, has yet to load 2 locomotives weighing 76 T each, with her own gear. The first locomotive is placed on deck (Quay side) Cg 13.83 m above the base and 6 m from CL. The derrick then plumbs the quay with its head 21.5 m above the base and 13 m from CL and lifts the second locomotive to be placed on deck on the other side. Calculate the maximum list during the operation.

**Q.2** A vessel of displacement 16,250T, KG 8.1m, KM 8.7m, needs to discharge a load of 80T from the deck located 3.5m to starboard of centreline and KG 10.2m using her own heavy lift crane, the head of which is 24.6m above keel. Calculate the maximum list during the operation if the crane is expected to reach 14.5m to the berth on port side.

**Q.3** Sketch and label Midship section of Compositely framed bulk carrier with hopper tanks. What is self-trimming hold?

**PART – B**

**Q.4** State the function of following documents as per MARPOL 73/78:

- |                    |                 |                            |
|--------------------|-----------------|----------------------------|
| a) Oil Record Book | b) SOPEP Manual | c) Garbage Management Plan |
|--------------------|-----------------|----------------------------|
- List out the information available in each.

**Q.5** Describe the contents and objectives of the Code of Safe Working Practices for Merchant Seaman. Explain Permit to Work systems.

**Q.6** Prepare detailed Risk Assessment for 'WORKING ALOFT' as per COSWP for the painting of the funnel; including hazard identification and control measures.

**Q.7** Sketch and define: i) Balanced Rudder    ii) Rake and Skew of propeller    iii) Shearing Force.

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1. Question in Part – A are compulsory and carry 25 marks each.
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**PART – A**

**Q.1** Use of M.V. Hindship arrives port in Condition No.11. She needs to load 200MT without changing her aft draft. Calculate the distance from the aft perpendicular where this weight should be loaded and the expected final draft forward.

**Q.2** A vessel is floating at drafts F: 11.48m, A: 12.26m. She is to complete loading at draft F: 11.9m, A: 12.10m. Space is available in No.5 hold 30m forward of AP, and No.2 hold 100m forward of AP. If the MCTC:120, TPC:32, LCF:6m, LBP:140m, determine:

- a) Distribution of cargo still to load
- b) Distribution of cargo to be loaded

**Q.3** Sketch and label the strengthening arrangement and weathertight closing arrangement of large hatch covers on cargo ships.

**PART – B**

**Q.4** a) What are different methods of control of organisms in ballast water and describe any one method of ballast water exchange in detail.

b) What are the contents of SOPEP & SMPEP

**Q.5** Make a Garbage management plan for your vessel. What locations on board should such a plan be Posted? What are special areas with respect to MARPOL Annex V?

**Q.6** The Electrician needs to up the radar mast for essential repairs. Carry out risk assessment of this task and make a check list incorporating all associated safety precautions.

**Q.7** a) How will you determine that the vessel is at Angle of Loll & how do you go about correcting angle of Loll?

b) Draw load lines of a cargo ship.

**Q.8** a) What are the Aims and objectives of ISM code and SMS?

b) How will you prepare your vessel for load line survey.

**Q.9** a) Enumerate the key requirements of MLC – 2006.

b) What are the 4 – fundamental factors that contribute towards “HRM” on board Ship?





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**PART – A**

**Q.1** A ship arrives port drawing 8.5 m fwd and 9.7 m aft. She has to load 600 t of cargo. The space is available 60 m fwd and 40 m aft of COF, which is mid-ship. MCTC = 250 tm and TPC = 20. Find how to distribute this 600 t of cargo if the ship is to finish loading 0.5 m by the stern. State also the final drafts fwd and aft.

**Q.2** M.V. Hindship is floating at a draft of F 5.65m and A 7.45m, LCG 70.47m forward of A.P. She loads 700 t of cargo 90m for'd of A.P. and discharges 200t of cargo from No. 5 LTD. Calculate final drafts F & A.

**Q.3** Sketch and label a hatch corner, showing the various strengthening arrangements. Also, explain how the strength is compensated for the openings on the main deck in way of hold.

**PART – B**

**Q.4** a) Why and where do you change water ballast as per Ballast water management?

b) What are the different methods of changing water ballast?

**Q.5** You are the OOW on a tanker in port and while bunkering there is a hose burst leading to oil spill. State what actions will you take?

**Q.6** As per 'Code of safe working practices' explain the precautions to be taken for

a) Fainting of Funnel

b) Handling of batteries

**Q.7** Briefly explain following terms with sketches where appropriate

a) Camber

b) Shear

c) Racking Stress

d) Bilge Keel

e) Rise of floor

**Q.8** a) Describe the functional requirements of ISM Code.

b) Describe the contents of ship security plan?

**Q.9** a) Define "Situational Awareness"

b) What are the six barriers to situational awareness?

c) Explain the Salient features of MLC 2006. List the Titles of MLC 2006.

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**PART – A**

**Q.1** M.V. Hind ship floating at a displacement of 19150 tonnes, KG 6.65m, FSC 0.042m, has yet to load 2 Locomotives weighing 76 tonnes each, with her own gear. The first locomotive is placed on deck (Quay side), CG 13.83 above the base and 6 meters from C/L. The derrick then plumbs the quay with its head 21.5m above the base and 13m from C/L) and lifts the second locomotive to be placed on deck on the other side. Calculate the maximum list during the operation.

**Q.2** A ship displacing 9000 Ts has KM 8.7 m, KG 7.2 m. She is now listed 8° deg port. She has port and starboard deep tanks, each 10m long, 10m wide, and 8m deep. The port side deep tank, which was full of SW, is pumped out until its sounding is 2 m, assuming that no other tanks on the ship are slack. Find the final list.

**Q.3** Draw and label a longitudinally framed double bottom of a Modern Bulk Carrier. State the uses of a double bottom tank.

**PART – B**

**Q.4** Explain/Enlist, with respect to MARPOL 73/78:

- a) Discharge criteria for discharging oily water mixtures from machinery spaces inside special areas.
- b) Cargo Record Book for chemical tankers.
- c) Garbage Management Plan.
- d) Emission Control Areas.

**Q.5** Describe the duties and responsibilities of a Health and Safety Officer as per the Code of Safe Working Practices. Explain the steps that should be taken to ensure safe working practices while working at:

- a) Anchor stations
- b) Galley

**Q.6** With suitable sketches, describe panting and pounding stresses and their nature in a seaway, and also the measures to be taken to counteract these stresses.

**Q.7** Write short notes on the following:

- a) DOC and SMC as per ISM code.
- b) DOS and CSR as per ISPS code.

**Q.8** With respect to UNCLOS, write short notes on the following:

- a) Territorial waters
- b) Exclusive Economic Zones (EEZ)
- c) Base Line
- d) Contiguous Zone

**Q.9** Is it good to be a Passive communicator rather than being an Aggressive or Assertive communicator?

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**Q.2** A vessel of displacement 16,250T, KG 8.1m, KM 8.7m, needs to discharge a load of 80T from the deck located 3.5m to starboard of centreline and KG 10.2m using her own heavy lift crane, the head of which is 24.6m above keel. Calculate the maximum list during the operation if the crane is expected to reach 14.5m to the berth on port side.

**Q.3** Sketch and label the Midship section of a Compositely framed bulk carrier with hopper tanks. What is self-trimming hold?

**PART – B**

**Q.4** State the function of the following documents as per MARPOL 73/78:

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- a) Quantity of cargo still to load.
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**Q.3** Sketch and label the strengthening arrangement and weathertight closing arrangement of large hatch covers on cargo ships.

**PART – B**

**Q.4** a) What are different methods of control of organisms in ballast water and describe any one method of ballast water exchange in detail.

b) What are the contents of SOPEP & SMPEP?

**Q.5** Make a Garbage management plan for your vessel. What locations onboard should such a plan be posted? What are special areas with respect to MARPOL Annex V?

**Q.6** The Electrician needs to up the radar mast for essential repairs. Carry out risk assessment of this task and make a checklist incorporating all associated safety precautions.

**Q.7** a) How will you determine that the vessel is at Angle of Loll & how do you go about correcting angle of Loll?

b) Draw load lines of a cargo ship.

**Q.8** a) What are the Aims and objectives of ISM code and SMS?

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**PART – A**

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**Q.2** A box shaped vessel 100m x 8m x 5m, KG 2.3 floating in salt water on an even keel draft 4.0 m Fwd and Aft. Find the new draft Fwd & Aft if a weight of 70 T already on board is shifted 50m aft.

**Q.3** Sketch and label Midship section of Compositely framed bulk carrier with hopper tanks. What is self-trimming hold?

**PART – B**

**Q.4** State the function of following documents as per MARPOL 73/78.

- a) Oil Record Book                      b) SOPEP Manual                      c) Garbage Management Plan  
List out the information available in each.

**Q.5** a) Define Particularly Sensitive Areas (PSSA). State the names of PSSA.

b) Explain the precautions to be taken while bunkering along side a berth and immediate action to be taken in case of oil spill on deck.

**Q.6** As per Code of Safe working practices for merchant seamen, explain the steps that should be taken to ensure safe working practices while entering an enclosed space and while working at height.

**Q.7** With respect to risk assessment, explain following:

- a) Hazard                                      b) Risk                                      c) Competent Person

**Q.8** Describe the difference between panting and pounding stresses. What structural arrangements are provided to withstand these stresses.

**Q.9** A leader has to lead his team from the front in various situations. What should be a leader's behavioral style in different situations? Support your answer with relevant shipboard examples.

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**PART – A**

**Q.1** M.V. Hind-ship in condition No. 3, sustained damage aft. To affect repairs, it is required to reduce the aft draft to 4.5m by loading 518 tons in the fore part of the vessel. Find how far abaft the fore perpendicular, this weight should be loaded?

**Q.2** An oil tanker 150m long, displacement 12500 tons, MCTC 200 leaves port with drafts 7.2m forward and 7.4m aft. There is 550 tons of fuel in the forward deep tank (Centre of gravity 70m forward of the centre of floatation) and 600 tons in the after deep tank (Centre of gravity 60m aft of centre of floatation). The centre of floatation is 1m aft of amid ship. During the sea passage 450 tons of oil is consumed from aft. Find how much oil must be transferred from the forward tank to the aft tank if the ship is to arrive on an even keel.

**Q.3** Draw a neat sketch and label Bilge and Ballast Piping on board a ship.

**PART – B**

**Q.4** a) Explain D1 and D2 standards of Ballast Water Management.  
b) Explain with a diagram the Sewage Treatment Plant on board your ship.

**Q.5** Your crew is required to paint the funnel of your ship. Prepare a Risk Assessment and the Checklist required prior to the operation.

**Q.6** Identify various possible hazards as to why an enclosed space should be considered “potentially dangerous”.

**Q.7** Describe the following terms with suitable sketches as applicable:

- a) Panting                      b) Rake                      c) Propeller Skew                      d) Pitch                      e) Boss

**Q.8** Write short notes on:

- a) Brief on DOC & SMC as per ISM code.
- b) Explain the information available on Shipboard Oil Pollution Emergency Plan (SOPEP)

**Q.9** Effective communication & situational awareness helps in smooth running of ships. Explain with an onboard situation.

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**PART – B**

- Q.4** a) Briefly describe the objectives and contents of MARPOL Annex I.  
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**Q.5** Describe the contents and objectives of the Code of Safe Working Practices for Merchant Seaman. Explain Permit to Work Systems.

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**Q.2** A ship of 10,000 t displacement has an initial GM of a 0.5m, FSM 120 TM is listed 2° to starboard. A shift in grain cargo of 100 t took place by 6 m horizontally to starboard 2m vertically upward. Find the resultant list.

**Q.3** Draw and label the Longitudinally framed double bottom tank. Enlist the benefits of a double bottom tank.

**PART – B**

**Q.4** Under Annex – I of Marpol 73/78, explain the discharge criteria for oily mixtures from cargo areas and Machinery spaces.

**Q.5** Write in detail, the precautions to be taken and procedure to be followed for receiving HFO bunkers. Draw up a check list listing out the precautionary checks being carried out.

**Q.6** Write in detail the procedure to be taken prior doing hot work on main deck of a cargo ship.

**Q.7** Write short notes on:

- |                    |                         |                  |
|--------------------|-------------------------|------------------|
| a) Sheer           | b) Stringer Plate       | c) Stealer Plate |
| d) Garboard Strake | e) Hogging & Staggering |                  |

**Q.8** a) List the elements of the ISM code.

b) Write short notes on ship security plan and various security levels.

**Q.9** a) What are the attributes of successful team leader?

b) Explain how you would motivate and educate the crew onboard, in order to instill safety consciousness and awareness, into their day to day lives?

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**PART – A**

**Q.1** M.V. Hindship floating in water of R.D. 1.012 at drafts F:5.16m, A:6.02m. She pumps out entire SW ballast from No. 1 and No. 4 (P, C and S), D.B. tanks. No. 3 (P and S) and No.5 D.B. tanks which were empty are filled with H.FO Calculate:

- a) Maximum quantity of cargo that can be loaded so that the vessel will be at summer draft on reaching the open sea. Fuel and water consumption for river passage is 70 Tons.
- b) GM (F) in docks if in departure condition KG = 8.75m, FSM = 1450.

**Q.2** A ship of 10,000 t displacement has an initial GM of 0.5m, FSM 120 tm is listed 2° to stbd. A shift of grain cargo of 100t took place by 6m place by 6m horizontally to Stbd 2m vertically upwards. Find the resultant list.

**Q.3** Draw and label a neat sketch of bilge piping system of a ship.

**PART – B**

**Q.4 a)** What are different methods of control of organisms in ballast water and describe any one method of ballast water exchange in detail.

**b)** What are the contents of SOPEP & SMPEP

**Q.5** Make a Garbage management plan for your vessel. What locations onboard should such a plan be posted? What are special areas with respect to MARPOL Annex V?

**Q.6** The Electrician needs to up the radar mast for essential repairs. Carry out risk assessment of this task and make a checklist incorporating all associated safety precautions.

**Q.7 a)** Prepare a Risk Assessment checklist for rigging of MOT ladder.

**b)** Explain the planned maintenance of Lift Boat and Davits.

**Q.8 a)** Write short notes on Doc & SMC as per ISM Code.

**b)** Explain the information available on SOPEP.

\*\*\*\*\*X\*\*X\*\*\*\*\*

**SECOND MATE OF A FOREIGN GOING SHIP**  
**FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE**  
**FOR PERSONS ON BOARD AT THE OPERATION LEVEL**  
**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY &**  
**ENVIRONMENT PROTECTION**

**TIME: 3 Hours****PASS MARKS: 120****MAX. MARKS: 200****Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** A ship of 10000 tonne displacement is floating in Sea water and has KM 10.8m, KG 9.0m. She is listing 10° to starboard. She has two rectangular deep tanks. One on either side each 12m long, 12m wide and 9m deep. The Stbd, tank is full of FW while the port one is empty. If FW is to be transferred from the starboard tank to the port tank, find the list if one third of the original FW in the starboard tank is transferred to the port tank (Use Fluid GM).

**Q.2** A ship floats in dock water of RD 1.008 with her winter loadline 80mm above waterline on the portside and 120 mm below the waterline on the starboard side. If FWA 220 mm, TPC SW = 28 and summer load draft = 9.6m. She shall consume 25t of bunkers and fresh water per day. After 2 days, vessel is expected to sail from port. Determine maximum quality of cargo to load basis voyage in summer zone. Also, state her departure draft in port.

**Q.3** Briefly describe various types of framing system on merchant ships and draw a Mid-ship section of a compositely framed ship.

**PART – B**

**Q.4** a) What is a special area as defined by the MARPOL 73/78? List the special areas for Annex I and Annex V.  
 b) What are the discharge criteria for disposal of garbage at sea?

**Q.5** a) Prepare a checklist for carrying out a painting inside enclosed spaces.  
 b) New Ch.Off and 3/Eng has joined the vessel. You are serving as 3/Off onboard. How will you conduct their safety familiarization?

**Q.6** a) Describe the salient features of an ISM Code.  
 b) Explain in brief DOS, Security Levels and SSO with respect to ISPS.

**Q.7** Illustrate following stresses on a vessel and describe how they are counteracted. Use sketches where appropriate.  
 a) Hogging/ Sagging                      b) Panting / Pounding                      c) Localized loading

**Q.8** a) List the elements of the ISM code.  
 b) Write short notes on ship security plan and various security levels.

**Q.9** What are the attributes of successful team leader? Explain how you would motivate and educate the crew onboard, in order to instill safety consciousness and awareness, into their day to day lives?

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**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship at a displacement of 13750 T, KG 7.28 M and FSM 1095tm is listed 2 degree to starboard and has yet to load 365 Tonnes of cargo. Space is available in No. 3 T Deck. 1.8 M to starboard of centre line and in No. 5 Upper Tween Deck. 5.5 M to the port of the centre line. Find the amount of cargo to be loaded in each space so that the ship will be upright on completion. Also, state the final GM (F).

**Q.2** A vessel of displacement 8,000 t, KM 6.40m, KG 5.80m, FSM 800 Tm, has to discharge cargo using ship's crane. During the operation the parcel of cargo Kg 2.5 m will be picked up by ships crane whose head is expected to be 12.5m above the keel and swung transversely through a distance of 15m. If during the operation the angle of list is not to exceed 5 degrees, determine maximum weight of cargo that can be picked up at one time.

**Q.3** Draw and label a midship section of double hull Oil tanker.

**PART – B**

**Q.4** a) Explain the different categories of the noxious liquid substances as per Annex II of MARPOL.  
b) Explain the discharge criteria of NLS in special areas and other areas as per MARPOL Annex II.

**Q.5** a) List contents of SOPEP MANUAL.  
b) Describe your actions when there is spillage of oil while transferring bunkers while in port.

**Q.6** a) Explain with example, how the safety of the ship's personnel is enhanced by conducting regular meetings of the Safety Health & Environment Committee.  
b) What is "Permit to work system"?

**Q.7** Explain the various stresses experienced by a ship and the structural members which compensate for same.

**Q.8** a) What are the Aims and objects of ISM code and SMS?  
b) Define the security levels in ISPS and what action needs to be taken if a vessel is Entering the port where it is security level 2?

**Q.9** a) Explain the ideal qualities of a team leader.  
b) Explain the need for:  
i) Effective Communication on board the ship  
ii) Familiarization with the work environment and procedures.

\*\*\*\*\*X\*\*X\*\*\*\*\*

**SECOND MATE OF A FOREIGN GOING SHIP**  
**FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE**  
**FOR PERSONS ON BOARD AT THE OPERATION LEVEL**  
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**TIME: 3 Hours****PASS MARKS: 120****MAX. MARKS: 200****Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship in condition No. 8 has to discharge 300t prior to sailing. Calculate the position w.r.t. AP from where the weight is to be discharged to enable her to sail trimmed 1.5m by stern. Also find the drafts Fwd and aft.

**Q.2** A vessel is floating at drafts F:11.48m, A:12.26m. She is to complete loading at draft F:11.9m, A:12.10m. Space is available in No. 5 hold 30m forward of AP and No. 2 hold 100m forward of AP. If the MCTC:120, TPC:32, LCF:64m, LBP:140m, determine:

- a) Quantity of cargo still to load.
- b) Distribution of cargo to be loaded.

**Q.3** Sketch and label

- a) Chain Locker and Hawse Pipe arrangement of a ship
- b) Solid floor of a longitudinally framed double bottom tank and bracket floor of a transversely framed double bottom tank.

**PART – B**

**Q.4** State the purpose and contents of the following documents as per MARPOL 73/78:

- |                      |                        |
|----------------------|------------------------|
| a) Oil Record book   | b) SOPEP Manual        |
| c) Cargo Record book | d) Garbage record book |

**Q.5** Your vessel is due for Annual Loadline Survey in the coming Dry Docking. Describe in detail what preparations would you make.

**Q.6** a) Explain with suitable sketch stealer plate?

b) Sketch and label balanced rudder stern frame?

c) What do you understand by painting and pounding? How are the stresses from forces taken care of in the build of a ship?

**Q.7** a) How will you determine that the vessel is at Angle of Loll & how do you go about correcting angle of Loll?

b) Draw load lines of a cargo ship.

**Q.8** a) What are the Aims and objectives of ISM code and SMS?

b) How will you prepare your vessel for load line survey.

**Q.9** a) Enumerate the key requirements of MLC 2006.

b) What are the 4-fundamental factors that contribute towards “HRM” on board ship?

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**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship arrives in condition No. 7 and discharges the entire cargo from No. 4 TD. Find the amount of ballast to be run into the Aft peak tank to bring her on even keel. Assume NO change in LCB due to ballasting of the tank.

**Q.2** A ship has summer free board of 4.2 M, which corresponds to a draft of 8.9m and a displacement of 16020 tonnes. Her TPC is 22.5 T. The ship is floating in water of RD 1.010 in tropical zone with the present free boards of 4.4 M on the starboard side and 4.3 M on the port side. It is estimated that the ship consumes 60 tonnes of HO, 10 tonnes of DO and 5 tonnes of fresh water on her passage down river to the berth. Find the maximum amount of cargo she can load at her berth in this zone.

**Q.3** Draw and label a neat diagram of a Fore-peak tank of a merchant ship.

**PART – B**

- Q.4** a) Explain the hazards associated with the Ballast Water Exchange?  
b) Explain the purpose and intent of the Ballast Water Management System?

- Q.5** a) Prepare an agenda for safety Committee meeting after more than 25% of the ship's complement has joined the ship.  
b) As per the Code of safe working practices explain the precautions to be taken when:  
i) Painting a Funnel  
ii) Handling Batteries

**Q.6** What are load line survey requirements? As a Third Officer what items will you check when assisting Chief officer in preparing for an Annual Loadline survey.

- Q.7** Explain: a) Racking stresses                      b) Panting and pounding                      c) shear strake  
d) Floor plate

- Q.8** a) What is Risk Assessment? What are the major steps involved in carrying our Risk Assessment?  
b) What is residual risk? How do you address same? Give 2 examples of same.

**Q.9** What is delegation of work? How will your delegate work and monitor task as a team leader?

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**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship is at a draft of F 8.778 m, A 8.792 m, LCG 72.34 m ford of AP. She discharges 206 tonnes of cargo from No. 5 LTD. Calculate the draft F and A.

**Q.2** A ship displacing 11000 tonnes has KG 7.7 m, KM 8.5 m and listed 4° to port. The ship is yet to load 760 tonnes of Cargo. Space is available at KG 10.6m, 5m to port of centre line and at KG 8.1m, 4.2m to sbtd of centre line. Divide the cargo so that the vessel complete loading upright.

**Q.3** Draw and label a neat diagram of fore-peak tank of a merchant ship.

**PART – B**

- Q.4** a) What are special areas as per Annex I & II of the MARPOL 73/78?  
b) What are the discharge criteria from cargo spaces of an oil takers as per MARPOL 73/78?  
c) What is the information available in the Shipboard Oil Pollution Emergency Plan (SOPEP)?

**Q.5** How the safety of ship's personnel is ensured by the following:  
a) Personal Protective Equipment (PPE)                      b) Permit to work system

**Q.6** a) What is a safety committee and what are its functions?  
b) With respect to the Code of Safe working practices describe the precautions to be taken when working aloft.

**Q.7** Explain the various stresses experienced by a ship and the structural members which compensate for the same.

**Q.8** a) What are the objectives of ISM Code?  
b) Define Exclusive Economic Zone (EEZ).

**Q.9** Describe the leadership qualities. How a good leadership may help in running your ship smoothly.

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**Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** A ship arrives port drawing 7 m fwd and 10 m aft, COF is amidships, McTc 220tm, TPC 25, Maximum permissible draft to cross a bar at the dock entrance is 9m. Due to a damaged forepeak, the draft fwd is not to exceed 7m. Find the minimum amount of cargo to be discharged into barges from No. 2 TD (HG 30m fwd) and No. 4 TD (HG 50 m aft) so that both conditions are satisfied.

**Q.2** M. V. Hind-ship at a draft of F = 5.38m, A = 6.17m, GM(F) 0.73m, FSC 0.085m, discharges 370t from no. 3 TD, Veg 10.2m and Loads 260 t in No. 5 LTD. 250 t of fuel oil was received equally distributed in no. 2 DB tanks (P & S). Calculate her GM (F).

**Q.3** Sketch and label a neat diagram of fore peak tank. Explain how the panting and pounding stresses are counteracted.

**PART – B**

**Q.4 a)** With reference to Annex I of Marpol 73/78, list out the entries to be made in the oil record book part-I & part-II.

b) What are the various cargo categories under Annex 2 of MARPOL and their discharge criteria?

**Q.5** What precautions you will take before carrying out painting in topside ballast tank of a bulk carrier?

**Q.6** Write short notes on the followings with suitable sketches as required.

- |                    |                      |
|--------------------|----------------------|
| i) Stealer Plate   | ii) Reserve buoyancy |
| iii) Angle of Loll | iv) Flare            |

**Q.7** Carry out a risk assessment as per COSWP for pilot boarding arrangements at night using a combination ladder. Make appropriate assumptions as applicable.

**Q.8 a)** Enumerate the key requirements of MLC – 2006.

b) What are the four fundamental factors that contribute towards “HRM” on board ship?

**Q.9** Define Teamwork. What are the factors affecting the performance of an individual while working in a Team?



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**TIME: 3 Hours**

**PASS MARKS: 120**

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**Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship floating at a displacement of 19150t, KG – 6.65m, FSC – 0.042m, has yet to load 2 locomotive weighing 76 T each, with her own gear. The first locomotive is placed on deck (Quay side). Cg 13.83m above the base and 6m from CL. The derrick then plumbs the quay with its head 21.5 m above the base and 13m from CL and lifts the second locomotive to be placed on deck on the other side. Calculate the maximum list during the operation.

**Q.2** A box shaped vessel 100m x 8m x 5m, KG 2.3 floating in salt water on an even keel draft 4.0m Fwd and Aft. Find the new draft Fwd & Aft if a weight of 70T already on board is shifted 50 m aft.

**Q.3** Sketch and label Midship section of Compositely framed bulk carrier with hopper tanks. What is self-trimming hold?

**PART – B**

**Q.4** State the function of following documents as per MARPOL 73/78:

- a) Oil Record book                      b) SOPEP Manual                      c) Garbage Management Plan

List out the information available in each.

**Q.5** Explain giving examples how the safety of the ship's personnel is ensured by:

- a) Safety Committee                      b) Permit to work system

**Q.6** As per Code of Safe Working Practices for Merchant Seamen, explain the steps that should be taken to ensure safe working practices while entering an enclosed space and while working at height.

**Q.7** a) Describe various types of welds.

- b) With respect to a propeller, describe: i. Face              ii. Skew              iii. Pitch

**Q.8** With respect to ISM Code explain the following:

- a) Designated Person                      b) Emergency Preparedness                      c) Documentation

**Q.9** A leader has to lead his team from the front in various situation. What should be a leader's behavioral style in different situations? Support your answer with relevant shipboard examples.

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**Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship is floating at a draft of F 7.2m and A 7.8m.

- a) Where with respect to AP, 210T of cargo is to be loaded to bring her on an even keel.
- b) If instead of loading as in a), the even keel condition was to be achieved by shifting cargo from No. 5 hold to No. 3 hold. Find the amount of cargo to be shifted?

**Q.2** M.V. Hindship is floating in dock water density 1.015 at a draft of ford 7.4m and aft 8.0m. KG 7.7m & FSC 0.05m. She has to load 2 heavy lifts weighing 75mt each with her own gear. The first locomotive is to be loaded on deck quay side CG 13.53m above the base and 6.2m from CL. The derrick then plumbs the quay on port side with its head 22m above the base and 15m from CL and lifts second heavy lift to be placed on deck.

- a) Calculate the maximum list during the operation and when will this occur.
- b) Calculate the list when the 2<sup>nd</sup> heavy lift is placed on deck 5m of CL to stbd CG 13.83m.

**Q.3** Sketch a labelled diagram of Midship section of OBO Carrier and describe its salient features.

**PART – B**

**Q.4** a) Explain the discharge criteria for Garbage as per MARPOL Annex V.

b) List the Special area under Annex I.

**Q.5** a) What precautions are necessary while tank cleaning in a crude oil tanker.

b) List out all PPE's in use on board vessel and describes where they are used.

**Q.6** Define:

- |                 |                              |                      |
|-----------------|------------------------------|----------------------|
| a) Base line    | b) Oil (Annex I MARPOL)      | c) Garbage (Annex 5) |
| d) Special area | e) Noxious liquid substances |                      |

**Q.7** Define:

- |            |                  |        |              |               |
|------------|------------------|--------|--------------|---------------|
| a) Chamber | b) Rise of floor | c) LBP | d) Deck line | e) Free board |
|------------|------------------|--------|--------------|---------------|

**Q.8** a) Discuss the function of safety committee on board your last ship.

b) What is safety management system under ISM code?

**Q.9** a) As per STCW 2010 what is a rest period? What is meant by "overriding operational conditions"?

b) Explain the need for effective communication onboard and familiarization with work environment and procedures.

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**Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship in Water of R.D. 1.012 is at a draft of For'd 5.16m, Aft 6.02m. She DEBALLASTS The Entire SW BALLAT From No. 1 and No. 4 (P, C & S). D.B. Tanks, No. 3.

- a) Maximum quantity of cargo that can be loaded so that the vessel will be at summer draft on reaching sea. Fuel and water consumption for river passage is 70 tonnes.
- b) GM fluid if in departure condition KG 8.75M, FSM 1450.

**Q.2** A vessel is floating at drafts F: 11.48m, A: 12.26m. She is to complete loading at drafts F: 11.90m, A:12.10m. Space is available in No. 5 hold 30m fwd of AP and No. 2 hold 100m fwd of AP. If the MCTC:120, TPC 32; LCF 64m, LBP 140m. Determine:

- a) Quantity of cargo still to load.
- b) Distribution of cargo to be loaded.

**Q.3** Sketch and label transverse midships cross-section of a compositely framed bulk carrier?

**PART – B**

**Q.4** a) What is a Special area as defined by MARPOL 73/78? List the special areas for Annex I and Annex IV.  
b) What is the discharge criteria for the disposal of garbage at sea?

**Q.5** Write short notes and give on board examples for:

- a) Situational Awareness
- b) Decision making

**Q.6** a) Define / explain with suitable sketches LBP, Flare, Sheer and Rise of Floor.

b) Sketch, label and explain the Bilge Keel

**Q.7** Describe following terms with neat diagram where appropriate:

- |                      |        |        |           |                  |
|----------------------|--------|--------|-----------|------------------|
| a) Load displacement | b) TPC | c) FWA | d) Camber | e) Angle of loll |
|----------------------|--------|--------|-----------|------------------|

**Q.8** Write short notes on:

- |                            |                       |  |
|----------------------------|-----------------------|--|
| a) Exclusive Economic Zone | b) Territorial waters | c) Hours of work and rest as per STCW 2010 |
|----------------------------|-----------------------|--|

**Q.9** a) Describe the objectives and functional requirements of ISPS code.

b) Describe the precautions to be taken during mooring / unmooring and when alongside.

\*\*\*\*\*X\*\*X\*\*\*\*\*

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**TIME: 3 Hours****PASS MARKS: 120****MAX. MARKS: 200****Notes:**

1. **Part A** – All questions are compulsory.
2. **Part B** – Attempt any five out of six.
3. All questions carry equal marks.

**PART – A**

**Q.1** A ship arrives port drawing 8.5 m fwd and 9.7m aft. She has to load 600 t of cargo. The space is available 60 m fwd and 40 m aft of COF, which is mid-ship. MCTC = 250 tm and TPC = 20. Find how to distribute this 600 t of cargo if the ship is to finish loading 0.5m by the stern. State also the final drafts fwd and aft.

**Q.2** A ship displacing 9000 Ts has KM 8.7m, KG 7.2m. She is now listed 8 deg to port. She has port and starboard deep tanks, each 10 m long, 10m wide and 8m deep. The port side deep tank, which was full of SW, is pumped out until its sounding is 2m, assuming that no other tanks on the ship are slack. Find the final list.

**Q.3** Sketch and label a hatch corner, showing the various strengthening arrangements. Also, explain how the strength is compensated for the openings on the main deck in way of hold.

**PART – B**

**Q.4** Explain / Enlist, with respect to MARPOL 73/78.

- a) Discharge criteria for discharging oily water mixtures from machinery spaces inside special areas.
- b) Cargo Record Book for chemical tankers
- c) Garbage Management Plan
- d) Emission Control Areas

**Q.5** Describe the duties and responsibilities of a health and Safety officer as per Code of safe working practices. Explain the steps that should be taken to ensure safe working practices while working at:-

- a) Anchor stations
- b) Galley

**Q.6** With suitable sketches, describe panting and pounding stresses and their nature in a seaway and also the measures to be taken to counteract these stresses.

**Q.7** Write short notes on followings: -

- a) DOC and SMC as per ISM code
- b) DOS and CSR as per ISPS code

**Q.8** With respect to UNCLOS, write short notes on followings:

- a) Territorial waters
- b) Exclusive economic zones (EEZ)
- c) Base Line
- d) Contiguous zone

**Q.9** Is it good to be a Passive communicator rather than being Aggressive or Assertive communicator?

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**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. **Part A** – All questions are compulsory.
2. **Part B** – Attempt any five out of six.
3. All questions carry equal marks.

**PART – A**

**Q.1** M.V. Hindship in D.W. density 1.007 T/m<sup>3</sup> is at draft of F 7.62m, A 7.94m. She has to load 440 T of cargo. Calculate the position with respect to AP, where this weight should be loaded so that she would be trimmed 1m by the stern on completion. Also state final F and A drafts in D.W.

**Q.2** A ship of 7500 tonnes displacement has KM 8.6 m, KG 7.8 m and 20 m beam, FSM 1075 Tm. Due rough weather a parcel of deck cargo is lost from the starboard side (KG 12.8 m, and centre of gravity 8m from centre line). The resulting list is 3 degrees 20 minutes to port, find the weight of cargo lost.

**Q.3** Sketch and label midship section of a cellular Container vessel.

**PART – B**

**Q.4** a) As per the Ballast Water convention describe the discharge criteria for ballast water. (10 marks)  
b) Explain any two methods used for Ballast Water exchange and precautions during such operations. (15 marks)

**Q.5** State the functions and contents of any two of the following Statutory documents as per Marpol 73/78  
a) Oil Record Book                      b) SOPEP manual                      c) Garbage Management Plan

**Q.6** a) What safety precautions will you take to go to forward mast for changing a navigational light bulb in restricted visibility? (10 marks)  
b) As per Code of Safe Working practice, describe how safety of ship's personnel is enhanced by  
i) Safety Committee                      ii) Permit to work system. (15 marks)

**Q.7** Describe the following ship's stresses with diagrams:  
a) Torsional                      b) Racking                      c) Panting                      d) Drydocking

**Q.8** Write short notes on: i) ISM Code                      ii) ISPS code

**Q.9** a) What should be the qualities of an Effective Team Leader? (10 marks)  
b) Explain Situational awareness while                      i) tank cleaning operations  
ii) Navigation in Restricted Visibility. (15 marks)

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**SECOND MATE OF A FOREIGN GOING SHIP**  
**FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE**  
**FOR PERSONS ON BOARD AT THE OPERATION LEVEL**  
**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY &**  
**ENVIRONMENT PROTECTION**

**TIME: 3 Hours****PASS MARKS: 120****MAX. MARKS: 200****Notes:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from PART – B and each question carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship is floating at a draft of Fwd 5.70 m, Aft 7.60m, discharges the entire cargo from No.4 TDK which is full. The stowage factor of the cargo is  $2/3 \text{ m}^3/\text{t}$ . Calculate the drafts after discharging.

**Q.2** A bulk carrier is at displacement presently 12250 t, KM 9.8m, KG 9.0, has a list  $6.5^\circ$  to stbd. She then loads 1250 t ore (KG 8m, 2m to stbd of centreline) and discharges 250 t of ore (KG 2m, 5m from stbd of centreline). 160 t of SW ballast is transferred vertically downward 9m and transversely 10m to port. Find the list assuming that there are no slack tanks, given final KM 9.6m.

**Q.3** Sketch and label Construction of Fore peak tank. How does its construction differ from other double bottom tanks in a ship?

**PART – B**

**Q.4** With reference to MARPOL 73/78 describe:

- a) SOPEP                      b) Categories of Noxious Liquid Substances                      c) Garbage management plan and Garbage Record Book.

**Q.5** a) Explain the various proactive measures to be taken to protect the marine environment.  
 b) Describe the procedure to be followed to ensure safe boarding arrangement for pilots?

**Q.6** a) Explain the duties of Safety Officers.  
 b) Describe the precautions to be taken while handling ropes and wires?

**Q.7** Describe with Sketch following:

- a) Panting and Pounding                      b) Transverse Stresses  
 c) Advance and Run                              d) Stealer Plate

**Q.8** Explain with the help of suitable diagram the following zones of India:

- a) Territorial zone      b) Contiguous Zone                      c) Exclusive Economic Zone

**Q.9** a) Write short notes on Maritime Labour Convention 2006.

b) Explain the need for effective communication on board and familiarization with work environment and procedures?

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**SECOND MATE OF A FOREIGN GOING SHIP**  
**FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE**  
**FOR PERSONS ON BOARD AT THE OPERATION LEVEL**  
**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY &**  
**ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Part – A – All questions are compulsory.
2. Part – B – Attempt any five out of six.
3. All questions carry equal marks.

**PART – A**

**Q.1** M.V. Hindship arrives in condition No. 8 has to discharge 300t prior to sailing. Calculate the position w.r.t. AP from where the weight is to be discharged to enable her to sail trimmed 1.5m by stern. Also find the drafts Fwd and aft.

**Q.2** A ship of 10,000t displacement has an initial GM of 0.5m, FSM 120 tm is listed 2° to stbd. A shift of grain cargo of 100t took place by 6m horizontally to stbd 2m vertically upwards. Find the resultant list.

**Q.3** Sketch and label:

- a) Chain Locker and Hawse Pipe arrangement of a ship.
- b) Solid Floor of longitudinally framed double bottom tank and bracket floor of a transversely framed double bottom tank.

**PART – B**

**Q.4** State the purpose and contents of the following documents as per MARPOL 73/78.

- a) Oil Record Book
- b) SOPEP Manual
- c) Cargo Record Book
- d) Garbage Record Book

**Q.5** Your vessel is due for Annual Loadline Survey in the coming Dry Docking. Describe in detail, what preparations would you make.

**Q.6 a)** Explain with suitable sketch stealer plate?

**b)** Sketch and label balanced rudder stern frame?

**c)** What do you understand by panting and pounding? How are the stresses from forces taken care of in the build of a ship?

**Q.7 a)** Prepare a Risk Assessment checklist for rigging of MOT ladder.

**b)** Explain the planned maintenance of Life Boat and Davits.

**Q.8 a)** Write short notes on Doc & SMC as per ISM Code.

**b)** Explain the information available on SOPEP.

**Q.9 a)** Define "Situational Awareness".

**b)** What are the six barriers of situational awareness. Explain the need for familiarization with work environment and procedures on board ship for new joiners.

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**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL  
PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY &  
ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carries 25 marks each.

**PART – A**

**Q.1** A ship of 10000 tonne displacement is floating in Sea water and has KM = 10.8m, KG = 9.0m. She is listing  $10^{\circ}$  to starboard. She has two rectangular deep tanks. One on either side each 12m long, 12m wide and 9m deep. The stbd. tank is full of FW while the port one is empty. If FW is to be transferred from the starboard tank to the port tank, find the list if one third of the original FW in the starboard tank is transferred to the port tank (USE Fluid GM).

**Q.2** A ship floats in dock water of RD 1.008 with her winter loadline 80 mm above waterline on the portside and 120 mmm below the waterline on the starboard side. If FWA = 220 mm, TPCSW = 28 and summer load draft = 9.6m. She shall consume 25t of bunkers and fresh water per day. After 2 days, vessel is expected to sail from port. Determine maximum quality of cargo to load basis voyage in summer zone. Also state her departure draft in port.

**Q.3** Briefly describe various types of framing system on merchant ships and draw a Mid-ship section of a compositely framed ship.

**PART – B**

**Q.4 a)** What is a special area as defined by the MARPOL 73/78?

List the special areas for Annex I and Annex V.

b) What are the discharge criteria for disposal of garbage at sea?

**Q.5 a)** Prepare a checklist for carrying out a painting inside enclosed spaces.

b) New Ch Off and 3/Eng has joined the vessel. You are serving as 3/Off onboard. How will you conduct their safety familiarization?

**Q.6 a)** Describe the salient features of an ISM code.

b) Explain in brief DOS, Security Levels and SSO with respect to ISPS.

**Q.7** Illustrate following stresses on a vessel and describe how they are counteracted. Use sketches where appropriate:

a) Hogging / Sagging

b) Panting / Pounding

c) Localized loading

**Q.8 a)** List the elements of the ISM code

b) Write short notes on ship security plan and various security levels.

**Q.9** What are the attributes of successful team leader? Explain how you would motivate and educate the crew onboard, in order to instill safety consciousness and awareness, into their day to day lives?

**SECOND MATE OF A FOREIGN GOING SHIP  
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ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carries 25 marks each.

**PART – A**

**Q.1** M. V. Hindship is floating in sea water, at drafts F: 8.04m, A: 8.64m. She is yet to load 500T of cargo in port. Space is available in No. 1 TDK, and No. 4 TDK. Determine:

- a) Distribution of the cargo so that in departure condition she is trimmed 35 cms by the stern.
- b) Fore and Aft sailing drafts.

**Q.2** A vessel of displacement 12500 T, KM 7m, KG 6.4m has a 3° list to stbd and has yet to load 500 tons of cargo. The space is available in the tween deck at a KG of 10m & 6m, each side of the centre line. Calculate the amount to be loaded on each side to complete the ship upright.

**Q.3** Draw a labelled diagram of the transom floor showing connections to the stern frame.

**PART – B**

**Q.4** What are the objectives of MARPOL Annex II? What are the various cargo categories under it and their discharge criteria?

**Q.5** Write in detail, the precautions to be taken and procedures to be followed for gas freeing tanks on a crude oil tanker.

- Q.6** a) Describe the precautions you would take when painting draft marks.
- b) Draw up safety checklist for 'working overside' as per code of safe working practices.

**Q.7** Explain the various stresses experienced by a ship and the structural members which compensate for the same.

**Q.8** Write short notes on:

- a) Hours of rest as per STCW 1995
- b) Territorial Waters
- c) DPA as defined on in ISM code.

**Q.9** a) Do you agree that it is beneficial to be passive rather than aggressive or assertive? Justify your statement.

b) Describe the essential quantities of Team Leader?



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**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carries 25 marks each.

**PART – A**

**Q.1** M. V. Hindship sails in condition no. 6. On the voyage, she is expected to consume 230 tonnes of fuel oil from no. 3 DB tanks. Find the amount to be consumed from each tank to arrive on an even keel.

**Q.2** M. V. Hindship at a displacement of 13750 t, KG 7.28m, and FSM 1095 tm is listed 2 deg to stbd and has yet to load 365 tonnes of cargo. Space is available in No. 3 TD 1.8m to stbd of centre line and in No. 5 UTD, 5.5m to port of centre line. Find the amount of cargo to be loaded in each space so that the ship will be upright on completion.

**Q.3** Sketch and label a neat diagram of fore peak tank. Explain how the panting and pounding stresses are counteracted.

**PART – B**

**Q.4** State the requirement of MARPOL 73/78 convention for the discharge of oil & oily mixture from machinery spaces. List the entries to be made in the ORB under the section.

- Q.5** a) Explain the precautions to be taken whilst bunkering.  
b) Describe the working of sewage plant with a block diagram.

- Q.6** a) Describe the safety precautions that need to be taken while working aloft.  
b) What precautions are required prior entering and enclosed space?

**Q.7** Explain the following ship stresses and describe various structural members available to compensate these stresses:  
a) Racking                      b) Torsional                      c) Panting                      d) Pounding

**Q.8** With respect to UNCLOS, write short notes on followings:  
a) Territorial waters                      b) Exclusive economic zones (EEZ)  
c) Base Line                      d) Contiguous zone

**Q.9** Define Situation Awareness. What are the six barriers to Situation Awareness? How Situation Awareness reduces the possibility of human errors.

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**SECOND MATE OF A FOREIGN GOING SHIP**  
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**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

**PART – A**

**Q.1** A ship of 10000 tonne displacement is floating in Sea water and has KM = 10.8 m, KG = 9.0 m. She is listing 10° to starboard. She has two rectangular deep tanks. One on either side each 12 m long, 12 wide and 9m deep. The stbd. tank is full of FW while the port one is empty. If FW is to be transferred from the starboard tank to the port tank, find the list if one third of the original FW in the starboard tank is transferred to the port tank. (USE Fluid GM).

**Q.2** M. V. Hindship is floating at a mean draft of 6.20m, Aft draft- 6.78. Trim – 1.16m. Forward Draft = 5.62m. A weight of 300 tonne is then shifted from No. 2 Tween deck to No. 1 Tween deck. Calculate her final draft F & A.

**Q.3** What is panting stress? Sketch and Label panting arrangements in the forward part of the ship.

**PART – B**

**Q.4** a) What is the special area as defined by the MARPOL 73/78? List the special areas for Annex I and Annex V.

b) What are the discharge criteria for disposal of garbage at sea?

**Q.5** Write short notes & give on board examples for:

a) Situational Awareness and

b) Decision Making

**Q.6** As per 'Code of safe working practices', explain the precautions to be taken for:

a) Painting of Funnel

b) Handling of Batteries

**Q.7** Briefly explain the following terms with sketches where appropriate:

a) Camber

b) Sheer

c) Racking Stress

d) Bilge Keel

e) Rise of floor

**Q.8** a) Describe the functional requirements of ISM Code.

b) Describe the contents of ship security plan.

**Q.9** a) What should be the qualities of Team Leader?

b) Explain the need for a Situation and risk assessment on board the ship.

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**SECOND MATE OF A FOREIGN GOING SHIP  
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ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hind-ship in dock water R.D. 1.010 is at a draft of F: 7.50m, A: 7.90m. She has to load 400t of cargo. Calculate the position with respect of AP, where this weight should be loaded so that she would be trimmed 1.2m by the stern on completion.

**Q.2** M. V. Hindship is floating at a mean draft of 6.20m, Aft draft- 6.78. Trim – 1.16m. Forward Draft = 5.62m. A weight of 300 tonne is then shifted from No. 2 Tween deck to No. 1 Tween deck. Calculate her final draft F & A.

**Q.3** Sketch and describe various types of rudders and illustrate their salient features.

**PART – B**

**Q.4** With reference to MARPOL 73/78 describe –

- a) SOPEP                      b) Categories of Noxious Liquid Substances                      c) Garbage categories.

**Q.5** Describe the duties and responsibilities of a health and Safety officer as per Code of safe working practices. Explain the steps that should be taken to ensure safe working practices while working at: -

- a) Anchor stations                      b) Galley.

**Q.6** Briefly explain following terms with sketches where appropriate:

- a) Camber                      b) Shear                      c) Racking Stress                      d) Bilge keel                      e) Rise of floor

**Q.7** Write short notes on followings:

- a) DOC and SMC as per ISM code                      b) DOS and CSR as per ISPS code.

**Q.8** a) State the onboard preparations for SEQ surveys.

b) Describe with respect to UNCLOS

- i) Baseline                      ii) EEZ                      iii) Innocent Passage

**Q.9** “Feedback and acknowledgement are considered important component of communication process”. Justify the statement with an onboard situation.

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# GOVERNMENT OF INDIA

Date: - 10<sup>th</sup> January-2022

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

### PART – A

**Q.1** M. V. Hindship floating in water of R.D. 1.012 at drafts F: 5.16m, A: 6.02m. She pumps out entire SW ballast from No.1 and No.4 (P, C and S), D.B. tanks. No.3 (P and S) and No. 5, D.B. tanks which were empty are filled with H. FO. Calculate:

- a) Maximum quantity of cargo that can be loaded so that the vessel will be at summer draft on reaching the open sea. Fuel and water consumption for river passage is 70 Tons.
- b) GM (F) in docks if in departure condition KG = 8.75m, FSM = 1450.

**Q.2** A vessel is floating at drafts, F: 11.48m, A: 12.26m. She is complete loading at draft F:11.9m, A: 12.10m. Space is available in No.5 hold 30m forward of AP and No. 2 hold 100m, forward of AP. If the MCTC: 120, TPC:32, LCF:64m, LBP:140m, determine:

- a) Quantity of cargo still to load
- b) Distribution of cargo to be loaded.

**Q.3** Draw and label a neat sketch of bilge piping system of a ship.

### PART – B

**Q.4** a) What are different methods of control of organisms in ballast water and describe any one method of ballast water exchange in detail.

b) What are the contents of SOPEP & SMPEP.

**Q.5** Make a Garbage management plan for your vessel. What locations onboard should such a plan is posted? What are special areas with respect to MARPOL Annex V?

**Q.6** The Electrician needs to up the radar mast for essential repairs. Carry out risk assessment of this task and make a checklist incorporating all associated safety precautions.

**Q.7** a) How will you determine that the vessel is at Angle of Loll & how do you go about correcting angle of Loll?

b) Draw load lines of a cargo ship.

**Q.8** a) What are the Aims and objectives of ISM code and SMS?

b) How will you prepare your vessel for load line survey.

**Q.9** a) Enumerate the key requirements of MLC – 2006.

b) What are the 4 – fundamental factors that contribute towards “HRM” on board Ship?

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# GOVERNMENT OF INDIA

Date: - 5<sup>th</sup> January-2022

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hindship, displacement 19050 Tons is floating on even keel draft in D.W.  $\delta = 1.015 \text{ T/m}^3$ . She has to load 487 Tons of cargo. Determine the location of cargo with respect to AP, so that in final condition she will trimmed 20 cms by stern. Also determine the aft draft in D.W. after completion of loading.

**Q.2** A ship of displacement 5000 tonnes has a tank 16m long, 10m wide and 4m deep which is empty. KM=7.2m, KG=7.0m. Find the GM fluid if 400t of oil of R.D. 0.95 is received in it.

**Q.3** Sketch and label the attachment of the panting stringers and panting beams of a forepeak tank with its frames.

**PART – B**

**Q.4** Explain the various stresses experienced by a ship and the structural members which compensate for the same?

**Q.5** Write short notes & illustrate with an onboard situation:

- a) Effective Communication and
- b) Motivation.

**Q.6** Write short notes on ISM Code and ISPS Code. How will you assist the chief Officer while preparing the vessel for ISM and ISPS Renewal Audits respectively?

**Q.7** What safety precautions will you take to go to the forward mast for changing navigational light bulbs in restricted visibility?

**Q.8** Prepare a checklist of item to be checked for entering an enclosed space, which a ballast tank.

**Q.9** As per Ballast Water Management Convention describe the discharge criteria for ballast water. Explain any two methods predominantly used presently for ballast water exchange and precautions during such operations.

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# GOVERNMENT OF INDIA

Date: - 1<sup>st</sup> December-2021

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

### PART – A

**Q.1** M.V. Hindship in condition No. 8 has to discharge 300 tonnes prior to sailing. Calculate the position with respect to A.P, from where this weight is to be discharged to enable her to sail trimmed 1.5 m by stern. Also find the sailing drafts F and A. (25 marks)

**Q.2** A ship of 10,000 t displacement has an initial GM of a 0.5m, FSM 120 TM is listed 2° to starboard. A shift in grain cargo of 100 t took place by 6m horizontally to starboard 2m vertically upward. Find the resultant list. (25 marks)

**Q.3** Sketch and Label construction of Fore Peak tank. Explain why its construction is different from other tanks on the ship and what additional measures are taken to strengthen it further. (25 marks)

### PART – B

**Q.4 a)** Explain D1 and D2 standards of Ballast Water Management (15 marks)

**b)** Explain with a diagram the Sewage Treatment Plant on board your ship. (10 marks)

**Q.5** Your crew is required to paint the funnel of your ship. Prepare a Risk Assessment and the Checklist required prior the operation. (25 marks)

**Q.6** Write in detail the procedure to be taken prior doing hot work on main deck of a cargo ship. (25 marks)

**Q.7** Describe the following terms with suitable sketches are appropriate: (25 marks)

a) Camber      b) Load Displacement      c) Angle of Loll      d) FWA      e) TPC

**Q.8** Write short notes on:

a) Brief on DOC & SMC as per ISM code. (10 Marks)

b) Explain the information available on Shipboard Oil Pollution Emergency Plan (SOPEP) (15 Marks)

**Q.9 a)** Define “Situational Awareness”. (5 Marks)

b) What are the six barriers to situational awareness. (10 Marks)

c) Explain the need for familiarization with work environment and procedures on board ship for new joiners. (10 Marks)

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# GOVERNMENT OF INDIA

Date: - 1<sup>st</sup> November-2021

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

### PART – A

**Q.1** M.V. Hindship in condition No. 8 has to discharge 300 tonnes prior to be sailing. Calculate the position with respect to A.P., from where this weight is to be discharged to enable her to sail trimmed 1.5 m by stern. Also find the sailing drafts F and A. (25 marks)

**Q.2** A ship arrives port drawing 8.5 m fwd and 9.7 m aft. She has to load 600 t of cargo. The space is available 60 m fwd and 40 m aft of COF, which is mid-ship.  
McTc = 250 tm and TPC = 20. Find how to distribute this 600 t of cargo if the ship is to finish loading 0.5 m by the stern. State also the final drafts fwd and aft. (25 marks)

**Q.3** Sketch and Label Water cooled stern tube. (25 marks)

### PART – B

**Q.4** a) Explain what all information are available in Ship Oil Pollution Emergency Plan (SOPEP). (15 marks)  
b) Describe Oil Record Book. (10 marks)

**Q.5** a) Prepare a checklist for carrying out painting inside enclosed spaces. (10 marks)  
b) Identify various hazards when working aloft towards risk assessment. (15 marks)

**Q.6** A seaman is to enter the duct keel on your vessel with yourself for inspection. Write down the Risk Assessment to be complied with along with the checklist needed for man entry. (25 marks)

**Q.7** Describe the following terms with suitable sketches are applicable:

a) Panting                      b) Rake                      c) Propeller Skew                      d) Pitch                      e) Boss

**Q.8** a) Explain the role of Classification Societies in the marine industry. (15 Marks)  
b) With Respect to UNCLOS, explain base line, continental shelf and EEZ. (10 Marks)

**Q.9** a) Explain Situational awareness while keeping bridge watch. (10 Marks)  
b) Importance of Management of      i) Fatigue                      ii) Motivation (15 Marks)

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# GOVERNMENT OF INDIA

Date: - 1<sup>st</sup> Sept-2021

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

### **PART – A**

**Q.1** M. V. Hindship at a draft of F: 6.92 m, A: 8.15m, loads 215 Tonnes in No: 2 hold and consumes 50T of FW from No: 8 Tank (Stbd), calculate final draft Forward and Aft.

**Q.2** A ship arrives port drawing 8.5m fwd and 9.7m aft. She has to load 600t of cargo. The space is available 60m fwd and 40m aft of COF, which is mid-ship. McTc = 250 tm and TPC = 20. Find how to distribute this 600t of cargo if the ship is to finish loading 0.5m by the stern. State also the final drafts fwd and aft.

**Q.3** Sketch and Label a water cooled Stern tube.

### **PART – B**

**Q.4** State the rules as per MARPOL for disposal of following from a chemical tanker carrying Annex II cargo in both special and outside special areas.

- a) Cargo residues of Category X, Y and Z from cargo Tanks
- b) E/ R Bilge water.

**Q.5** Write short notes on:

- a) Garbage Management Plan (8 Marks)
- b) Oil Record Book (8 Marks)
- c) SMPEP (9 Marks)

**Q.6 a)** Define Particularly Sensitive Areas (PSSA). State the names of PSSA (12 Marks)

**b)** Explain the precautions to be taken while bunkering alongside a berth and immediate action to be taken in case of oil spill on deck. (13 Marks)

**Q.7** With respect to risk assessment, explain following:

- a) Hazard
- b) Risk
- c) Competent Person

**Q.8** Describe the differences between panting and pounding stresses. What structural arrangements are provided to withstand these stresses.

**Q.9 a)** How will you conduct a safety committee meeting on board and what are the responsibilities of a safety officer. (12 Marks)

**b)** What are the advantages of team work. (13 Marks)

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 2<sup>nd</sup> Aug-2021

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

### PART – A

**Q.1** M. V. Hindship floating at a mean draft of 7.12 m in water of RD = 1.008, KG 6.12 m, loads 900 t of cargo in 3 TD, 2m off CL to port and 200 t in no. 4 td 2.5 m to stbd of CL. An 80 t lift is discharged from deck kg 14.1 m cg 4 m to port of CL. Calculate her final mean draft and angle of list if the FSC in final condition was 0.12m.

**Q.2** A vessel with displacement 10000 T length – 100 mtr, drafts F – 6.00 mtr, A – 7.00 mtr, KM – 10 mtr, KG – 7.8 mtr, TPC – 25. Vessel is still to load more by 0.2 mtr, MCTC – 150 tm, HF is at 2 mtr aft of midship, FSM – 370 tm. Find the cargo to load.

**Q.3** Sketch and Label construction of Fore Peak tank. Explain why its construction is different from other tanks on the ship and what additional measures are taken to strengthen it further.

### PART – B

**Q.4** a) Explain what all information are available in Ship Oil Pollution Emergency Plan (SOPEP).

(Marks 15)

b) Describe Oil Record Book

(Marks 10)

**Q.5** a) There is fire in Engine Room. Describe the procedure to fight it.

(Marks 15)

b) As per Code of Safe working practices explain the precautions to be taken for painting ship side in the port.

(Marks 10)

**Q.6** Recently in Mumbai Harbor, a pilot lost his life while boarding the ship in rough weather. Make a root cause analysis & describe the action you would take to minimize this risk in future.

**Q.7** Differentiate between following with suitable sketches.

a) Panting and Pounding

b) Sheer and Flare

c) Camber and Rise of Floor

d) Stress and Strain

e) Hog and Sag

**Q.8** Write short notes on:

a) Exclusive Economic Zone

b) Certificates issued under ISM Code.

c) Hours of rest as per STCW 2010.

**Q.9** a) Do you agree it is beneficial to be passive rather than aggressive or assertive? Justify

(Marks 10)

b) Describe the essential qualities of Team Leader.

(Marks 15)

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 12<sup>th</sup> July-2021

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

### PART – A

**Q.1** M. V. Hindship displacing 16398T, KG 7.15m, FSC 0.08m, discharged 280T, kg 6.20 CG 1.4 off CL stbd and loaded 280T Kg 6.20m, CG 3.5m to stbd of CL. A 70T of parcel of cargo was shifted horizontally from 3.6m port of CL to 1.2m port of CL. Calculate the resultant list.

**Q.2** A ship loaded to her summer draft and floating in SW, KG 7.85m, KM 8.05m, FSM 1500 tm, discharges 300 ts of cargo from KG 14m. After discharge she enters in docks and found floating to her summer draft in water of R.D. 1.010. Determine the GM (F) in the final condition.

**Q.3** Draw a neat sketch of midship section of longitudinally framed self trimming bulk carrier and label its parts.

### PART – B

**Q.4** Explain with respect to Marpol 73/78.

- a) Emission Control Areas. (Marks 5)
- b) Ship Board Oil Pollution Emergency Plan (SOPEP) (Marks 5)
- c) Garbage record book (Marks 5)
- d) With help of suitable diagram, explain the working of Sewage treatment plant fitted on board. (Marks 10)

**Q.5** Explain the precautions to be taken while bunkering alongside a berth and immediate actions to be taken in case of oil spill on deck.

**Q.6** As per Code of Safe Working Practices, explain the precautions to be taken for:

- a) Painting Funnel
- b) Entry into enclosed space.

**Q.7** Describe following terms with neat diagram where appropriate:

- a) Camber
- b) Load Displacement
- c) Angle of Loll
- d) FWA
- e) TPC

**Q.8** What do you understand by UNCLOS, with respect to UNCLOS write short notes on:

- a) Territorial Waters
- b) Exclusive Economic Zone

**Q.9** What are the attributes of successful team leader? Explain how would you motivate and educate the crew on board in order to imbibe safety consciousness awareness into their day to day lives.

\*\*\*\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 5<sup>th</sup> April-2021

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of 6 questions from Part – B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hind-ship floating at a displacement of 19150 tonnes, KG – 6.65, FSC - 0.042 m, has yet to loads Locomotives weighing 76 tonnes each with her own gear. The first locomotive is placed on deck (Quay side), cg 13.83 m above the base and 6 meters from C/L. The derrick then plumbs the quay with its head 21.5 m above the base and 13m from C/L and lifts the second locomotive to be placed on deck on the other side. Calculate the maximum list during the operation.

**Q.2** An oil tanker 150m long, displacement 12500 tons, MCTC 200 leaves port with drafts 7.2 m forward and 7.4 m Aft. There is 550 tons of fuel in the forward deep tank (Centre of gravity 70m forward of the centre of floatation) and 600 tons in the after deep tank (Centre of gravity 60m aft of centre of floatation). The centre of floatation is 1m aft of amid ship. During the sea passage 450 tons of oil is consumed from aft. Find how much oil must be transferred from the forward tank to the aft tank if the ship is to arrive on an even keel.

**Q.3** Draw and label the Longitudinally framed double bottom tank. Enlist the benefits of a double bottom tank.

**PART – B**

**Q.4** Under Annex – I of Marpol 73/78, explain the discharge criteria for oily mixtures from cargo areas and Machinery spaces.

**Q.5** Write in detail, the precautions to be taken and procedure to be followed for receiving HFO bunkers. Draw up a check list listing out the precautionary checks being carried out.

**Q.6** Identify various possible hazards as to why an enclosed space should be considered “Potentially Dangerous”.

**Q.7** Describe the following terms with suitable sketches as applicable:

- a) Panting                      b) Rake                      c) Propeller Skew                      d) Pitch                      e) Boss

**Q.8 a)** Explain the role of Classification Societies in the marine industry. (15 Marks)

b) With respect to UNCLOS, explain base line, continental shelf and EEZ. (10 Marks)

**Q.9 a)** Define “Situational Awareness” (5 Marks)

b) What are the six barriers to situational awareness (10 Marks)

c) Explain the need for familiarization with work environment and procedures on board ship for new joiners. (10 Marks)

\*\*\*\*\*x\*\*x\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 1<sup>st</sup> March-2021

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Questions in Part – A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part – B and carry 25 marks each.

### PART – A

**Q.1** M. V. Hind-ship in condition No. 3, sustained damage aft. To affect repairs, it is required to reduce the aft draft to 4.5m by loading 518 tons in the fore part of the vessel. Find how far abaft the fore perpendicular, this weight should be loaded?

**Q.2** A ship arrives port drawing 8.5m fwd and 9.7 m aft. She has to load 600t of cargo. The space is available 60m fwd and 40m aft of COF, which is mid-ship.  $McTc = 250 \text{ tm}$  and  $TPC = 20$ . Find how to distribute this 600 t of cargo if the ship is to finish loading 0.5m by the stern. State also the final drafts fwd and aft.

**Q.3** Neatly sketch and label access openings for cargo tanks on an oil tanker. Illustrate their purpose and salient features.

### PART – B

**Q.4** State the purpose and contents of the following documents as per MARPOL 73/78:

- |                    |                      |                        |
|--------------------|----------------------|------------------------|
| a) Oil Record Book | b) SOPEP Manual      | c) Garbage Record book |
| d) VRP             | e) Cargo Record Book |                        |

**Q.5** a) Define Special area as per Marpol and list out special areas for Annex IV & V.

b) Explain the precautions to be taken while bunkering alongside a berth and immediate actions to be taken in case of oil spill on deck.

**Q.6** a) What is a Safety Committee and what are its functions.

b) With respect to the code of safe working practices describe the precautions to be taken when welding repair to be carried on deck fire line.

**Q.7** a) Describe various types of framing in use on ships and illustrate their uses and features.

b) Describe Floors, beams, brackets, pillows and Girders.

**Q.8** a) Describe objectives and the functional requirements of ISPS code.

b) Describe the precautions to be taken during mooring / unmooring and when alongside?

**Q.9** a) Explain why situational awareness is important for the safe running of the ship?

b) How to plan, coordinate and assign work to personnel.

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 11<sup>th</sup> December-2021

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours  
200

PASS MARKS: 120

MAX. MARKS:

### Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part – B and carry 25 marks each.

### PART – A

**Q.1** M. V. Hind-ship in condition No. 3, sustained damage aft. To affect repairs, it is required to reduce the aft draft to 4.5m by loading 518 tons in the fore part of the vessel. Find how far abaft the fore perpendicular, this weight should be loaded?

**Q.2** A ship of 10,000 t displacement has an initial GM of a 0.5 m, FSM 120 TM is listed 2° to starboard. A shift in grain cargo of 100 t took place by 6 m horizontally to starboard 2m vertically upward. Find the resultant list.

**Q.3** Draw a neat sketch and label Bilge and Ballast Piping on board a ship.

### PART – B

**Q.4** a) Explain D1 and D2 standards of Ballast Water Management. (15 Marks)

b) Explain with a diagram the Sewage Treatment Plant on board your ship. (10 Marks)

**Q.5** Your crew is required to pain the funnel of your ship. Prepare a Risk Assessment and the Checklist required prior the operation.

**Q.6** Write in detail the procedure to be taken prior doing hot work on main deck of a cargo ship.

**Q.7** Write short notes on:

a. Sheer

b. Stringer Plate

c. Stealer Plate

d. Garboard Strake

e. Hogging & Sagging

**Q.8** Write short notes on:

a) Brief on DOC & SMC as per ISM Code. (10 marks)

b) Explain the information available on Shipboard Oil Pollution Emergency Plan. (SOPEP) (15 marks)

**Q.9** Effective communication & situational awareness helps in smooth running of ships. Explain with as on board situation.

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 1<sup>st</sup> December-2020

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hindship in condition No. 8 has to discharge 300 tonnes prior to sailing. Calculate the position with respect to A.P., from where this weight is to be discharged to enable her to sail trimmed 1.5m by stern. Also find the sailing drafts F and A. (25 marks)

**Q.2** A ship loaded to her summer draft and floating in SW, KG 7.85m, KM 8.05m, FSM 1500 tm, discharges 300 Ts of cargo from KG 14m. After discharge she enters in docks and found floating to her summer draft in water of R.D. 1.010. Determine the GM (F) in the final condition. (25 marks)

**Q.3** Sketch and label Water cooled stern tube. (25 marks)

**PART – B**

**Q.4 a)** Explain any two methods predominantly used for Ballast Water Exchange and precautions during such operations. (15 marks)

b) W.r.t. Annex V list out for food waste discharge criteria. (10 marks)

**Q.5 a)** Prepare a checklist for carrying out painting inside enclosed spaces. (10 marks)

b) Identify various hazards when working aloft towards risk assessment. (15 marks)

**Q.6 a)** Explain the duties of a safety officer and safety representative on board a vessel. (10 marks)

b) State the objective of ISM Code. (15 marks)

**Q.7** Describe the following terms with suitable sketches as applicable:

a) Panting      b) Rake      c) Propeller Skew      d) Pitch      e) Boss

**Q.8 a)** Explain the role of Classification Societies in the marine industry. (10 marks)

b) In the context of ISM code explain:

i) Objective of SMS      ii) Near Miss      iii) Non-Conformity (15 marks)

**Q.9 a)** Explain Situational awareness while keeping bridge watch. (10 marks)

b) Importance of Management of:      i) Fatigue      ii) Motivation (15 marks)

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 9<sup>th</sup> November-2020

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hindship floating at a hydrostatic draft of 5.5m, KG 7.53m, FSC in the final condition 0.104m, has to load 1200 tonnes of cargo in no. 2 hold and no. 2 TD. Find the amount of cargo to be loaded in each space to complete the ship with a GM (fluid) of 1.0m.

**Q.2** A ship of displacement 7000t, KG 7.0m, has to load a parcel of cargo of 1600 t at the centerline and thereafter a heavy lift of 95 t using her own derrick, the head of which is 25 m above the keel with an outreach of 15 m from the centerline. If her KM in final condition is 8.0 m, at what maximum Kg should 1600 t be loaded so that when the heavy lift is being loaded, list will not exceed 9°?

**Q.3** Sketch and label a neat diagram of forepeak tank.

**PART – B**

**Q.4 a)** What is a special area as defined by MARPOL 73/78? List the special area for Annex I and Annex V.

b) What are the discharge criteria for disposal of garbage at sea?

**Q.5 a)** Describe the composition of safety committee and the agenda for monthly Safety Committee meeting.

b) Explain the precautions to be taken during the ballast water exchange at sea.

**Q.6** As per Code of safe working practices, explain the precautions to be taken for:

i) Embarkation of Pilot.

ii) Carrying out hot work onboard ship.

**Q.7** Define the following with sketches where appropriate:

a) Camber

b) Rise of floor

c) Flare

d) Shear

e) Rake

**Q.8** Explain the contents of “Five Titles” of MLC, 2006.

**Q.9 a)** What is motivation? Explain any one theory to use for motivation.

b) Describe the essential attributes of effective team leader.

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 1<sup>st</sup> October-2020

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hindship in a river Port of Density 1.014 is at drafts F: 4.5m, A: 6.0m, LCG= 71.62m. She loads 470t, Leg = 60.20m. Find her final drafts.

**Q.2** A vessel with displacement 25500 T, KM 10.5m, KG 10.0 m, has a pair of rectangular double bottom wing (port & stbd) tanks on either side of the centerline 15m long x 10m wide x 5m deep. Calculate the list produced if one of the double bottom wing tanks is filled to 50% with SW ballast.

**Q.3** Sketch and label a side profile view of a transom stern showing the propeller and a semi-balanced rudder.

**PART – B**

**Q.4** a) List the different categories of garbage as per MARPOL, Annex V.

b) List the discharge criteria of garbage as per MARPOL, Annex V.

c) List the records to be maintained as per MARPOL, Annex V.

(5+10+10 marks)

**Q.5** As the officer in charge of maintenance of safety equipment, enumerate the weekly and monthly maintenance checks to be carried out on safety equipment.

**Q.6** Prepare detailed Risk Assessment for “WORKING ALOFT” as per COSWP for the maintenance of ship’s mast including hazard identification and control measures.

**Q.7** Sketch and describe:

i) Corrugated Bulkhead

ii) Chain Locker

iii) Beam Knees

**Q.8** a) List any 10 statutory certificates to be carried on a general cargo ship as mentioned in SOLAS.

b) Briefly state the salient points of guidance and requirements for rest hours for watch keepers as per STCW 2010.

**Q.9** Describe a role of a team leader incharge of mooring stations. Enumerate the team building initiatives that you should apply to ensure safe and efficient operations.

\*\*\*\*\*x\*\*x\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 09<sup>th</sup> March-2020

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hindship floating at a draft of F 5.20m & A 7.40m, LCG 70.47m, fwd of AP, loads 1000t of cargo, 100.5m fwd of AP. Calculate her (i) Final Displacement (ii) Final Hydrostatic Draft (iii) Final Draft F & A.

**Q.2** From a ship of 8000t, KM 8.6M, KG 8.0m, some deck cargo was washed overboard (KG 10.0, 8.0m from centre line). If the resultant list is 3° then find the quantity lost if the FSM was 800TM.

**Q.3** Sketch and label transform stern of a large ocean-going ship showing connections to the ship's frame.

**PART – B**

**Q.4** Explain / Enlist, with respect to MARPOL 73/78;

- a) Discharge criteria for discharging oily water mixtures from machinery spaces inside special areas.
- b) Cargo Record Book for chemical tankers
- c) Garbage Management Plan
- d) Emission Control Areas

**Q.5** Draw the starboard side load lines of cargo vessel with following particulars: summer draft: 7.200m, summer displacement: 18000Ts, TPC at 7.2m, draft: 20. Describe the dimensions and distances between various load lines.

**Q.6** Write in detail the precautions to be taken prior doing hot work inside the ballast tank adjacent to cargo oil tank.

**Q.7** Describe with neat sketches the construction features in a ship to compensate for panting and pounding.

**Q.8** Write short notes on the following:

- a) OPA-90
- b) Civil Liability Convention
- c) London Dumping Convention

**Q.9 a)** Explain situational awareness while keeping Bridge watch.

**b)** What are the tools for effective communication and how does it help improve team work on board ships.

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 08<sup>th</sup> Jan-2020

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**Notes:**

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hindship floating at a mean draft of 5.5 mt, KG 7.53 m, FSC in the final condition 0.104m, has to load 1200 tonnes of cargo in No.2 hold and No. 2 TD. Find the amount of cargo to be loaded in each space to complete the ship with a GM (Fluid) of 1m.

**Q.2** A ship displacing 18000 tonnes, KG 7.0 m, KM 7.9 m is to load 70 tonnes. The crane's head is 40m above the keel and 16m to stbd of Ship's centerline. Find the maximum list and the final list when the weight is loaded 5 m to stbd of centerline at a height 12m above the keel.

**Q.3** Sketch and label Mid-Ship section of compositely framed bulk carrier with hopper tanks. What is self trimming hold?

**PART – B**

**Q.4** State the function of following documents as per MARPOL 73/78:

- a) Oil Record Book                      b) SOPEP Manual                      c) Garbage Management Plan

List out the information available in each.

**Q.5** List the precautions for purging and gas freeing on an oil tanker.

**Q.6** With reference to 'Code of Safe working practices for Merchant Seaman', explain the precautions to be taken for hot work on main deck of a Bulk carrier.

**Q.7** a) Explain panting and pounding stresses.

b) How is the ship strengthened against panting and pounding stresses?

**Q.8** a) What are functions and objectives of ISM Code?

b) What are the duties of ship security officer?

**Q.9** a) Explain the duties and responsibilities of seafarers under MLC 2006.

b) What are the factors which can contribute to fatigue?

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 11<sup>th</sup> November-2019

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** M. V. Hiondship floating in sea water at a draft of F 8.40M & A 8.80M, LCG 72.34M fwd of AP, discharges 300t of Cargo, from no. 5 LTD. Calculate her

- i) Final displacement
- ii) Final Hydrostatic draft
- iii) Final Draft F & A

**Q.2** A box shaped vessel 65m x 12m x 8m has KG = 4m and is floating in salt water upright on an even keel at 4m draft F & A. Calculate the GZ at 5 degrees heel.

**Q.3** Sketch and label the Mid-Ship section of a large crude carrier.

**PART – B**

**Q.4** State the rules as per MARPOL 73/78 for disposal of following from a chemical tanker carrying Annex II cargo in both special and outside special areas – Cargo residue of Category X, Y and Z from cargo tanks.

**Q.5** Gas cutting and welding of a pipeline has to be carried out on main deck. How will you conduct a risk assessment for this work and state the precautions to be taken before and during the operation.

**Q.6** a) Describe the duties and responsibilities of a safety officer as contained in the Code of Safe Working Practices (COSWP).

b) Make a checklist for permit to work in an enclosed space.

**Q.7** Write short Notes along with uses and sketches on:

- a) Tumblehome                      b) Keel Rake                      c) Gussett Plate                      d) Torsion Stress

**Q.8** a) Write briefly about: DOC and SMC as per ISM code and DOS and CSR as per ISPS code.

b) Explain the information available in Shipboard Oil Pollution Emergency Plan (SOPEP).

**Q.9** List out some traits of a good leader? How effective communication does helps in smooth running of ships. Explain with on board situations.

\*\*\*\*\*X\*\*X\*\*\*\*\*

# GOVERNMENT OF INDIA

Date: - 5<sup>th</sup> Sept-2019

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** It is required to load 220 tonnes of cargo on M. V. Hindship in condition No. 2. Find where this weight should be loaded to keep after draft unchanged.

**Q.2** A ship of displacement 10000t has No. 3 & 4 DB tanks full of oil of RD 0.95. The tanks are 15m long, 12m wide and 2m depth. HFO is consumed from No. 3 port till a sounding of 1.2m is obtained. If KM is 7.8m, KG is 7.075m, calculate the list.

**Q.3** Sketch and label the Mid-Ship section of a container vessel.

**PART – B**

**Q.4** State the discharge criteria as per MARPOL Annex I and Annex IV?

**Q.5** a) Explain the procedure for Entry into Enclosed space.  
b) Prepare a risk assessment matrix for painting of the funnel of your ship.

**Q.6** a) How would you motivate your crew for safe operations during mooring situations?  
b) What is meant by Resource Management?

**Q.7** Define the following with suitable sketches:  
a) Rake            b) Deck line            c) Margin Line            d) Shear Strake

**Q.8** a) Write short notes w.r.t. the ISM Code:            i) Audit            ii) DOC            iii) SMC  
b) State the different security levels as per the ISPS Code and your actions as duty officer in port at each level.

**Q.9** With respect to ship board personnel management explain in brief the followings:  
a) Importance of management of fatigue.  
b) Importance of assertiveness.  
c) Importance of motivation.

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# GOVERNMENT OF INDIA

Date: - 9<sup>th</sup> July-2019

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

### PART – A

**Q.1** M.V. Hindship at a displacement of 13750 t, KG 7.28 m, and FSM 1095 tm is listed 2° to stbd and has yet to load 365 tonnes of cargo. Space is available in No. 3 TD, 1.8 m to stbd of centre line and in No.5 UTD, 5.5 m to port of centre line. Find the amount of cargo to be loaded in each space so that the ship will be upright on completion.

**Q.2** A ship arrives port drawing 9.0 m even keel draft. She has to load 600 t of cargo. The space is available 60 m fwd and 40 m aft of COF, which is mid-ship.  
McTc = 250 tm and TPC = 20. Find How to distribute this 600 t of cargo if the ship is to finish loading 0.5 m by the stern. State also the final drafts fwd and aft.

**Q.3** Sketch and label a neat diagram off fore peak tank. Explain how the panting and pounding stresses are counteracted.

### PART – B

**Q.4** State the requirement of MARPOL 73/78 convention for the discharge of oily mixture from machinery spaces. List the entries to be made in the ORB under this section.

**Q.5** What precautions you will take before carrying out painting in topside ballast tank of a bulk carrier.

**Q.6** Write short notes on following with suitable sketches as required:

- a) Stealer plate
- b) Flare
- c) Localized stresses
- d) Transverse stresses

**Q.7** Carry out a risk assessment as per Code of safe working practices for pilot boarding arrangements at night using a combination ladder. Make appropriate assumptions as applicable.

**Q.8** Write short notes on followings:

- a) Document of Compliance and Safety Management Certificate as per ISM Code.
- b) Declaration of Security and Continuous Synopsis Record as per ISPS Code.

**Q.9** Define Team work. What are the factors affecting performance of an individual while working in a Team?

\*\*\*\*\*X\*\*X\*\*\*\*\*

SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship at a draft of F 5.38m, A 6.17m, GM (F) 0.73m, FSC 0.085m, discharges 370 t, from no.3 TD, Veg 10.2 m and Loads 260 t in No. 5 LTD, 250 t of fuel oil was received equally distributed in no.2 DB tanks (P & S). Calculate her GM (F).

**Q.2** A ship of 10000 t displacement is floating in SW and has KM of 10.8m and KG of 9.0m. She is listed 10° to stbd. She has two rectangular deep tanks, one on either side each 12m long, 12m wide and 9m deep. The stbd tank is full of FW and port tank is empty. If FW is to be transferred from the starboard tank to the port tank find:

- i. The quantity of FW to be transferred to bring the ship upright.
- ii. The list of two thirds off the original FW is transferred to the port tank.

**Q.3** Sketch and label a hatch corner, showing the various strengthening arrangements. Also explain how the strength is compensated for the openings on the main deck in way of hold.

**PART – B**

**Q.4** a) With reference to Annex I of MARPOL 73/78, list out the entries to be made in the oil record book Part-I and Part-II.

b) What are the various cargo categories under annex 2 of MARPOL and their discharge criteria?

**Q.5** a) What precautions and procedures are to be followed in rigging boarding arrangements for a Pilot?

b) Explains the precautions to be taken during ballast exchange?

**Q.6** Describe the duties and responsibilities of a health and Safety officer as per Code of safe working practices. Explain the steps that should be taken to ensure safe working practices while working at:-

- a) Anchor stations
- b) Galley

**Q.7** With suitable sketches, describe panting and pounding stresses and their nature in a seaway and also the measures to be taken to counteract these stresses.

**Q.8** With respect to UNCLOS, write short notes on followings:

- a) Territorial waters,
- b) Exclusive economic zones (EEZ)
- c) Base Line
- d) Contiguous Zone.

**Q.9** Define Situation Awareness. What are the six barriers to Situation Awareness? How Situation Awareness reduces the possibility of human errors.

SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

PART – A

**Q.1** M.V. Hindship sails in condition no.6. On the voyage, she is expected to consume 230 tonnes of fuel oil from no.3 DB tank and no.7 DB tanks. Find the amount to be consumed from each tank to arrive on an even keel.

**Q.2** A vessel of  $W = 6550$  t,  $KG = 6.0$  m has to load further 1500t of cargo. At what KG should it be loaded if the ship has to ensure Righting Moment of 350 mt at heel of  $3^\circ$ . KM in final condition is 7.0m.

**Q.3** Sketch and label mid ship section of compositely framed cargo ship.

PART – B

**Q.4** Explain contents of garbage management plan and entries to be made in garbage record book.

**Q.5** a) Explain the precautions to be taken whilst bunkering.  
b) Describe the working off sewage treatment plant with a block diagram.

**Q.6** a) Describe the safety precautions that need to be taken while working aloft.  
b) What precautions are required prior entering an enclosed space?

**Q.7** Explain the following ship stresses and describe various structural members available to compensate these stresses:  
a) Racking,    b) Torsional    c) Panting    d) Pounding

**Q.8** Prepare a checklist for preparation of SEQ survey.

**Q.9** a) What do you mean by “rest period”? What is meant by “overriding operational conditions”?  
b) Explain situational awareness. How situational awareness reduces the possibility of human errors?

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SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

PART - A

**Q.1** M.V. Hind-ship in dock water of R.D. 1.010 is at a draft of F: 7.50 m, A: 7.90 m. She has to load 400t of cargo. Calculate the position with respect of AP, where this weight should be loaded so that she would be trimmed 1.2m by the stern on completion.

**Q.2** M. V. Hind-ship at a displacement of 13750 t, KG 7.28m, and FSM 1095 tm is listed 2 deg to stbd and has yet to load 365 tonnes of cargo. Space is available in No.3 TD, 1.8m to stbd of centre line and in No.5 UTD, 5.5m to port of centre line. Find the amount of cargo to be loaded in each space so that the ship will be upright on completion.

**Q.3** Sketch and label a neat diagram of fore peak tank. Explain how the panting and pounding stresses are counteracted.

PART - B

**Q.4** State the requirement of MARPOL 73/78 convention for the discharge of oil & oily mixture from machinery spaces. List the entries to be made in the ORB under this section.

**Q.5** Describe the duties and responsibilities of a health and Safety officer as per Code of safe working practices. Explain the steps that should be taken to ensure safe working practices while working at:-

- (a) Anchor stations (b) Galley

**Q.6** Briefly explain following Terms with sketches where appropriate:

- (a) Camber (b) Shear (c) Racking Stress  
(d) Bilge Keel (e) Rise of Floor

**Q.7** Write short notes on the following:

- a) DOC and SMC as per ISM code b) DOS and CSR as per ISPS code.

**Q.8** With respect to UNCLOS, write short notes on followings:

- a) Territorial waters b) Exclusive economic zones (EEZ)  
c) Base Line d) Contiguous Zone

**Q.9** Define Situation Awareness. What are the six barriers to Situation Awareness? How Situation Awareness reduces the possibility of human errors.

\*\*\*\*\*X\*\*X\*\*\*\*\*

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART - A**

**Q.1** M. V. Hind ship is at a draft of F: 8.778m, Aft: 8.792m, LCG: 72.34m fwd of AP. She discharges 196t of cargo from No. 5 lower tween deck, calculate the draft fwd and aft.

**Q.2** A ship of displacement 14800T KM 10.4, KG 9m was floating upright. Subsequently the following operations were carried out:-

- a) 210 tons loaded at KG 7.2 m, 6m to stbd of centerline.
  - b) Removed 280 tons from tank, being 7m to port of centerline.
  - c) 75 tons of ballast was shifted from 3 port DB to 3 stbd DB through 14m.
- Find the resultant list.

**Q.3** Draw and label a longitudinally framed double bottom of a Modern Bulk Carrier. State the use of a double bottom tanks.

**PART - B**

**Q.4.** a) What is the relevance of Ballast Water Convention in marine environmental protection?  
b) Sketch and describe: a) Beam Knees b) Skew of propeller.

**Q.5** As per 'Code of Safe Working Practices' explain the precautions to be taken for:  
(a) Embarkation of Pilot (b) Carrying out Hot work on board ship.

**Q.6** (a) Prepare a Risk Assessment checklist for rigging of MOT ladder.  
(b) Describe code of safe working practices on board the ship while working on radar scanner.

**Q.7** Define: (a) Camber (b) Rise of Floor (c) LBP (d) Deck Line (e) Free Board

**Q.8** Write short notes on:  
(a) Hours of rest as per STCW 2010 (b) Territorial Waters (c) DPA as defined in ISM Code.

**Q.9** (a) Do you agree it is beneficial to be passive rather aggressive or assertive? Justify.  
(b) Describe the essential qualities of Team Leader?

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**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART - A**

**Q.1** A ship of displacement 5000 tonnes has a tank 16m long, 10m, wide and 4m deep which is empty. KM=7.2m, KG=7.0m.

Find the GM fluid if 400t of oil of R.D. 0.95 is received in it?

**Q.2** A vessel of displacement 16000t, KG 9.0m loaded cargo as follows: 1000t Kg 8.0m; 2000t Kg 6.0m and 1500t Kg 10.0m. Further 2000t of cargo is to be loaded for which space is available in the lower hold Kg 5.0m and in the tween deck Kg 11.0m. Calculate the weight to be loaded in each space so that the final KG<sub>solid</sub> would be 8.75m. The FSM is 2250tm.

**Q.3** Sketch and label the attachment of the panting stringers and panting beams of a forepeak tank with its frames.

**PART - B**

**Q.4.** Explain the various stresses experienced by a ship and the structural members which compensate for the same?

**Q.5** Write short notes & illustrate with an onboard situation:

- a. Effective Communication, and
- b. Motivation

**Q.6** As per Ballast Water Management Convention describe the discharge criteria for ballast water. Explain any two methods predominantly used presently for ballast water exchange and precautions during such operations.

**Q.7** Write Short notes on ISM Code and ISPS Code. How will you assist the Chief Officer while preparing the vessel for ISM and ISPS Renewal Audits respectively?

**Q.8** What safety precautions will you take to go to the forward mast for changing a navigational light bulbs in restricted visibility.

**Q.9** Prepare a checklist of item to be checked for entering an enclosed space, which a ballast tank.

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**SECOND MATE OF A FOREIGN GOING SHIP  
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**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Part A is compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART - A**

**Q.1** M.V. Hindship floating in water of R.D. 1.012 at drafts F: 5.16m, A: 6.02m. She pumps out entire SW ballast from No. 1 and No. 4 (P, C and S), D.B. tanks. No.3 (P and S) and No. 5 D.B. tanks which were empty are filled with H.F.O. Calculate:

- a) Maximum quantity of cargo that can be loaded as that the vessel will be at summer draft on reaching the open sea. Fuel and water consumption for river passage is 70 Ts.
- b) GM (F) in docks if in departure condition KG = 8.75m, FSM = 1450.

**Q.2** A vessel is floating at drafts F: 11.48m, A: 12.26m. She is to complete loading at drafts F:11.9m, A:12.10m. Space is available in No. 5 hold 30m forward of AP and No. 2 hold 100m forward of AP. If the MCTC:120, TPC:32, LCF:64m, LBP:140m determine:

- (a) Quantity of Cargo still to load
- (b) Distribution of cargo to be loaded.

**Q.3** Draw and label a neat sketch of bilge piping system of a ship.

**PART - B**

**Q.4.a)** What are different methods of control of organisms in ballast water and describe any one method of ballast water exchange in detail.

b) What are the contents of SOPEP & SMPEP.

**Q.5** Make a Garbage management plan for your vessel. What locations onboard should such a plan be posted? What are special areas with respect to MARPOL Annex V?

**Q.6** The Electrician needs to up the radar mast for essential repairs. Carry out risk assessment of this task and make a checklist incorporating all associated safety precautions.

**Q.7 a)** How will you determine that the vessel is at Angle of Loll & how do you go about correcting angle of Loll?

b) Draw load lines of a cargo ship.

**Q.8 a)** What are the Aims and objectives of ISM code and SMS?

b) How will you prepare your vessel for load line survey.

**Q.9 a)** Enumerate the key requirements of MLC-2006.

b) What are the 4-fundamental factors that contribute towards "HRM" on board ship?

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SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATION LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART - A**

**Q.1** A ship of 10000 tonne displacement is floating in Sea Water and has KM = 10.8m, K.G. = 9.0m. She is listing 10<sup>th</sup> to starboard. She has two rectangular deep tanks. One on either side each 12m long, 12m wide and 9m deep. The stbd. tank is full of FW while the port one is empty. If FW is to be transferred from the starboard tank to the port tank, find the list if one third of the original FW in the starboard tank is transferred to the port tank. (USE Fluid GM).

**Q.2** M.V. 'Hindship' is floating at a mean draft of 6.20m, Aft draft – 6.78, Trim – 1.16m, Forward draft – 5.62m. A weight of 300 tonne is then shifted from No.2. Tween deck to No.1 Tween deck. Calculate her final draft F&A.

**Q.3** What is panting stress? Sketch and Label panting arrangements in the forward part of the ship.

**PART - B**

**Q.4.a)** What is the special area as define by the MARPOL 73/ 78? List the special areas for Annex I and AnnexV.  
b) What are the discharge criteria for disposal of garbage at sea?

**Q.5** Write short notes & give on board examples for the same.

- a. Situational Awareness, and
- b. Decision Making.

**Q.6** As per 'Code of safe working practices' explain the precautions to be taken from

- a) Painting of Funnel
- b) Handling of batteries

**Q.7** Briefly explain following terms with sketches where appropriate:

- a) Camber
- b) Shear
- c) Racking Stress
- d) Bilge keel
- e) Rise of floor

**Q.8 a)** Describe the functional requirements of ISM code.

b) Describe the contents of ship security plan?

**Q.9 a)** What should be the qualities of a Team Leader?

b) Explain the need for a situation and risk assessment on board the ship.

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6-11-17 AM

Code 101 A

**GOVERNMENT OF INDIA**  
**SECOND MATE OF A FOREIGN GOING SHIP**  
**FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE**  
**FOR PERSONS ON BOARD AT THE OPERATIONAL LEVEL**  
**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY**  
**& ENVIRONMENT PROTECTION**

**TIME: 3 HOURS**

**PASS MARKS: 120**

**MAX MARKS: 200**

**Notes:**

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART A**

- Q1. M.V. Hind-ship in dock water of R.D 1.007 is at a draft of F: 7.62 m, A: 7.94 m. She has to load 450 t of cargo. Calculate the position with respect of AP, where this weight should be loaded so that she would be trimmed 1.0 m by the stern on completion.
- Q2. A ship arrives at port X at the mouth of a river. Her displacement is 12000 ts and arrival draft is 5.77 m in R.D 1.020. She is to cross a bar upriver before entering port Y. The depth at the bar is 6.0 m and R.D 1.005. If her TPC is 25, Find the minimum quantity of cargo to off-load at port X so that she may cross the bar with an under-keel clearance of 0.5 m.

**PART-B**

- Q3. Sketch and label a neat diagram of fore peak tank.
- Q4. Sketch and describe: a) Beam knees b) Strum Box c) Rake of propeller d) Skew of propeller.
- Q5. Write short notes & illustrate with an on board situation:  
a. Communication Behavior Styles, and  
b. Traits of a good leader
- Q6. Write short notes on the following  
a. Role of the flag State and port State in ensuring legal compliances (Conventions) by ships; and  
b. Right to Innocent Passage by merchant ships as per UNCLOS.
- Q7. With reference to MARPOL 73/78 describe the following:  
i. SOPEP;  
ii. Categories of Noxious Liquid Substance;  
iii. Garbage Management Plan
- Q8. As per OOW carry out a risk assessment to navigate the vessel in fog & in congested waters.
- Q9. Make a check list for enclosed space entry permit to work for doing welding inside a fuel oil tank.

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**GOVERNMENT OF INDIA**

Date: - 5<sup>th</sup> September-2017

**SECOND MATE OF A FOREIGN GOING SHIP**

**FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE FOR PERSONS ON BOARD AT THE OPERATIONAL LEVEL**

**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY & ENVIRONMENT PROTECTION**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART – A**

**Q.1** M.V. Hindship arrives in a port in condition no.8 discharged 300 t, Kg 6.40 m, Cg 1.6m off the CL to port of CL and loaded 300t Kg 6.40m, Cg 3.7m to port of CL. A 75t parcel of cargo was shifted horizontally from 4.5 m port of CL to 1.3m port of CL. Calculate the resultant list.

**Q.2** A vessel arrives at port Haldia where DW density is RD1.016 with her winter loadline 100mm below water on port side and 180 mm below water on stbd side. Her FW allowance is 200 mm. TPC is 24 and summer draft is 9.6 m. Find DWT available?

**Q.3** Sketch and label the Transom stern of a ship showing connections to the stern frame.

**PART B**

- Q.4** a) Explain the ballast water management plan & Explain various method of ballast exchange?  
b) Describe the controls on emissions of SOx & NOx in SECA areas as per Annex-VI of MARPOL 73/78?

**Q.5** While bunkering at Mumbai, hose burst, and there was serious oil pollution. State the actions to be taken as a duty officer.

- Q.6** a) Describe the functions of safety committee on board a ship as per code of safe working practices. Explain the duties of the Safety Officer.  
b) List the precautions for changing a navigation bulb at foremast in wind force BF scale of 5.

**Q.7** Describe various types of framing in use on ships and illustrate their uses and features.

- Q.8** a) What is ISM code? Explain the elements of the ISM code.  
b) Explain the precautions to be taken while transmitting piracy prone area.

- Q.9** a) Describe the essential attributes of effective team leader?  
b) Prepare a risk assessment table for renewing the lifeboat falls?

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GOVERNMENT OF INDIA  
SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATIONAL LEVEL  
PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY  
& ENVIRONMENT PROTECTION  
PASS MARKS: 120

Code 98A

TIME: 3 HOURS

MAX MARKS: 200

Notes:

- 1 Questions in Part A are compulsory and carry 25 marks each.
- 2 Attempt 5 out of 6 questions from Part B and carry 25 marks each.

PART - A

- Q. 1 A ship of W 18000 t, KM 7.5m, KG 6.2m, TPC 25 is listed 4° port. The present mean draft is 8.6 m and it is to finish loading at 8.8 m even keel. Space is available 6 m off the centerline on either side. State how much cargo is to be loaded on either side to finish upright?
- Q. 2 An oil tanker 150m long, displacement 12500tons, MCT 1cm 200 tons m leaves port with drafts 7.2m F and 7.4m A. There is 550 tons of fuel oil in the forward deep tank (centre of gravity 70m forward of the centre of floatation) and 600tons in the after deep tank (centre of gravity 60m aft of centre of floatation), the centre of floatation is 1m aft of amid ships. During the sea passage 450tons of oil is consumed from aft. Find how much oil must be transferred from the forward tank to the after tank if the ship is to arrive on an even keel.
- Q. 3 Sketch and Label Mid ship section of a compositely framed bulk carrier.

PART - B

- Q. 4 a) What is the special area as defined by the MARPOL 73/78? List the special areas for Annex I and Annex V.  
b) What are the discharge criteria for disposal of garbage at sea?
- Q. 5 a) Explain the ballast water management plan of your last vessel?  
b) Explain various methods of Treatment of Ballast?  
c) Explain various methods of Ballast exchange?
- Q. 6 What precautions will you take if you have to go to the main mast for changing a navigational light bulb in restricted visibility?
- Q. 7 Explain with diagrams and write short notes on  
a) Impressed current type Cathodic protection  
b) Balanced Rudder
- Q. 8 a) Briefly explain the important elements of SOLAS chapter XI-2  
b) Describe Contiguous zone and continental shelf
- Q. 9 a) What should be the qualities of a Team Leader?  
b) Explain the need for a situation and risk assessment on board the Ship?

XXX



GOVERNMENT OF INDIA  
SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CONTROLLING THE OPERATION OF THE SHIP & CARE  
FOR PERSONS ON BOARD AT THE OPERATIONAL LEVEL  
PAPER: SHIP CONSTRUCTION, STABILITY, SHIP  
SAFETY & ENVIRONMENT PROTECTION

Code 312/10

TIME: 3 HOURS

PASS MARKS: 120

MAX MARKS: 200

Notes:

1. Questions in Part A are compulsory and carry 25 marks each
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each

PART A

- Q.1 M.V. Hindship arrived in a port with drafts F-6.60m A-7.92m in RD of water there was 1.012. 2000t of cargo to be loaded in this port. Space available is no.2 hold. Calculate her final drafts Fwd & Aft
- Q.2 A ship displacing 9000t, KM 11.0m, KG 9.7m, FSC 0.105m is listed 5° to port. She has to load 2100t of cargo with COG on centerline, KG 7.5m. Find the final list
- Q.3 Sketch and label transverse mid-ship section of a compositely framed Bulk Carrier

PART B

- Q.4 Define with sketches where appropriate:  
i. Run      ii. Stem Rake      iii. Gusset Plate
- Q.5 Describe the functional requirement of ISM Code. In context of ISM Code what is a near miss and non-conformity?
- Q.6 a) State the purpose and contents of the following statutory documents as per MARPOL 73/78 - Oil Record Book, SOPEP Manual, and Garbage Management Plan  
b) As per STCW 2010 what is a rest period? What is meant by "overriding operational conditions"?
- Q.7 Enumerate the elements of ISM code and describe under the same code:  
i) DPA and his role  
ii) Non - conformity  
iii) Major non conformity  
iv) Near miss reports
- Q.8 As OOD and team leader during a port arrival how will you organize personnel for cargo operations and completion of various company check lists?
- Q.9 Make a risk assessment analysis chart for lowering of free fall lifeboat at mid sea

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JULY - 2017



**GOVERNMENT OF INDIA**  
**SECOND MATE OF A FOREIGN GOING SHIP**  
**FUNCTION: CONTROLLING THE OPERATION OF SHIP & CARE**  
**FOR PERSONS ON BOARD AT THE OPERATIONAL LEVEL**  
**PAPER: SHIP CONSTRUCTION, STABILITY, SHIP**  
**SAFETY & ENVIRONMENTAL PROTECTION**

TIME: 3 HOURS

PASS MARKS: 120

MAX MARKS: 200

**Notes:**

1. Part-A is compulsory and carries 25 marks each
2. Attempt any 5 out of the 6 questions from Part B and each question carries 25 marks

**PART - A**

- Q.1 M.V. Hindship is floating in sea water, at drafts F: 8.04m, A: 8.64m. She is yet to load 500T of cargo in port. Space is available in No.1 TDk, and No 4 TDk. Determine:
- a) Distribution of the cargo so that in departure condition she is trimmed 35 cms by the stern
  - b) Fore and Aft sailing drafts
- Q.2 A ship floats in dock water of RD 1.008 with her winter loadline 80 mm above waterline on the portside and 120 mm below the waterline on the starboard side. If FWA = 220mm, TPCSW = 28 and summer load draft = 9.6m. She shall consume 25t of bunkers and fresh water per day. After 2 days, vessel is expected to sail from port. Determine maximum quantity of cargo to load basis voyage in summer zone. Also state her departure draft in port
- Q.3 Briefly describe various types of framing system on merchant ships and draw a Mid-ship section of a compositely framed ship

**PART - B**

- Q.4 a) What is a special area as defined by the MARPOL 73/78? List the special areas for Annex I and Annex V  
 b) What are the discharge criteria for disposal of garbage at sea?
- Q.5 Write in detail, the precautions to be taken and procedures to be followed for gas freeing tanks on a crude oil tanker
- Q.6 a) Describe the precautions you would take when painting draft marks  
 b) Draw up safety checklist for 'working overside' as per code of safe working practices
- Q.7 Explain the various stresses experienced by a ship and the structural members which compensate for the same
- Q.8 a) List the elements of the ISM code  
 b) Write short notes on ship security plan and various security levels
- Q.9 What are the attributes of successful team leader?  
 Explain how you would motivate and educate the crew onboard, in order to instill safety consciousness and awareness, into their day to day lives?

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MAX MARKS: 200

Notes:

1. Part-A is compulsory and carries 25 marks each
2. Attempt any 5 out of the 6 questions from Part B and each question carries 25 marks

PART - A

Q.1 A ship of LBP 150 m, MCTC 350 tm, TPC 34, COF 1m, Fwd of midship draws 8.0m ford and 10.3m aft, Find the final drafts when the following operations were carried out:

- a) 2000t loaded in No. 2LH 40 m ford of HG
- b) 400t loaded in No. 4LH 25m aft of HG
- c) 100T SW transferred from AP tank to FP tank distance 125m.
- d) 175t discharged from No.3 LH 1 m aft of HG

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Q.2 M.V. Hindship is floating in dock water density 1.015 at a draft of ford 7.4 m and aft 8.0m. KG 7.7m & FSC 0.05m. She has to load 2 heavy lifts weighing 75mt each with her own gear. The first locomotive is to be loaded on deck quay side CG 13.83m above the base and 6.2m from CL. The derrick then plumbs the quay on port side with its head 22m above the base and 15m from CL and lifts second heavy lift to be placed on deck.

- a) Calculate the maximum list during the operation and when will this occur. 19.15°
- b) Calculate the list when the 2nd heavy lift is placed on deck 5m of CL to stbd CG 13.83m 0.45°

Q.3 Sketch a labeled diagram of Midship section of OBO Carrier and describe its salient features

PART - B

- Q.4 a) Explain the discharge criteria for Garbage as per MARPOL Annex V
- b) List the Special area under Annex I

Q.5 As per 'Code of Safe working Practices' explain the precautions to be taken for:

- a) Embarkation of pilot
- b) Carrying out Hot work on board ship

- Q.6 a) Prepare a Risk Assessment checklist for rigging of MOT ladder
- b) Explain the planned maintenance of a Life Boat and davits

Q.7 Write short notes on the following:

- a) Bilge Keel
- b) Flat plate keel
- c) Floors

- Q.8 a) Discuss the functions of safety committee on board your last ship
- b) What is safety management system under ISM code?

- Q. 9 a) As per STCW 2010 what is a rest period. What is meant by "overriding operational conditions"?
- b) Explain the need for effective communication onboard and familiarization with work environment and procedures

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SAFETY & ENVIORNMENTAL PROTECTION

Code 90A

TIME: 3 HOURS

PASS MARKS: 120

MAX MARKS: 200

Notes:

1. Part-A is compulsory and carries 25 marks each
2. Attempt any 5 out of the 6 questions from Part B and each question carries 25 marks

PART - A

- 15 | Q.1 M.V. 'Hindship' is floating at a draft of F 7.2m and A 7.8m  
 a) Where with respect to AP, 210T of cargo is to be loaded to bring her on an even keel  
 b) If instead of loading as in (a), the even keel condition was to be achieved by shifting cargo from No.5 hold to No.3 hold. Find the amount of cargo to be shifted?
- 15 | Q.2 A vessel of displacement 12500T, KM 7m, KG 6.4m, has a 3° list to stbd and has yet to load 500 tons of cargo. The space is available in the tween deck at a KG of 10m & 6m, each side of the center line. Calculate the amount to be loaded on each side to complete the ship upright.
- 15 | Q.3 Draw a labeled diagram of the transom floor showing connections to the stern frame

PART - B

- 15 | Q.4 What are the objectives of MARPOL Annex II? What are the various cargo categories under X and their discharge criteria?
- 20 | Q.5 a) What precautions are necessary while tank cleaning in a crude oil tanker.  
 b) List out all PPE's in use on board vessel and describe where they are used
- 20 | Q.6 Define:  
 a) Base line  
 b) oil (Annex 1 MARPOL)  
 c) Garbage (Annex 5)  
 d) Special area  
 e) Noxious liquid substances
- 15 | Q.7 Define:  
 a) Camber  
 b) Rise of floor  
 c) LBP  
 d) Deck line  
 e) Free board
- 20 | Q.8 Write short notes on:  
 a) Hours of rest as per STCW 1995  
 b) Territorial Waters  
 c) DPA as defined on in ISM code
- Q. 9 a) Do you agree that it is beneficial to be passive rather than aggressive or assertive? Justify your statement.  
 b) Describe the essential qualities of Team leader?

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**SAFETY & ENVIRONMENT PROTECTION**

Code 89A

**TIME: 3 HOURS**

**PASS MARKS: 120**

**MAX MARKS: 200**

**Notes:**

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

**PART A**

- ✓ Q.1 M.V. Hindship arrives in a port in condition No.8 discharged 300t, KG 6.40m, CG 1.6m off the CL to port of CL and loaded 300t KG 6.40m, CG 3.7m to port of CL. A 75t parcel of cargo was shifted horizontally from 4.5m port of CL to 1.3m port of CL. Calculate the resultant list.
- ✓ Q.2 A ship of W = 7400t KM = 8.5, KG 8.0, lost some deck cargo KG 11m & 3.5m from  $L_{67.61}$ . If the resultant list was 3.5°, calculate the amount of cargo lost.
- Q.3. Sketch and label the Transom stern of a ship showing connections to the stern frame.

**PART B**

- ✓ Q.4 State the functions of the following documents as per MARPOL 73/78  
a) Oil record book b) SOPEP Manual c) Garbage management plan  
List out the information available in each document.
- ✓ Q.5 a) Explain about Safety Committee on board ship and what are its functions.  
b) Explain the Role and duties of Safety Officer on board ship.
- ✓ Q.6 As per Code of Safe Working Practices, describe how the safety of ship's personnel is ensured by the following:  
a) Safety committee b) Permit to work system
- Q.7 (a) Define with sketches as applicable:  
i) Camber ii) Sheer iii) Flare  
b) What is the function of a stealer plate. Explain with a suitable sketch.
- Q.8 Explain in brief contents of 'Five Titles' of MLC 2006.
- ✓ Q.9 a) Describe the essential attributes of effective team leader.  
b) Prepare a Risk Assessment for hot work on the poop deck on a Tanker.

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**JAN 2017**

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GOVERNMENT OF INDIA  
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SAFETY & ENVIRONMENT PROTECTION

Code 85A

TIME: 3 HOURS

PASS MARKS: 120

MAX MARKS: 200

Notes:

1. Questions in Part A are compulsory and carry 25 marks each.
2. Attempt 5 out of 6 questions from Part B and carry 25 marks each.

07/11/2016

PART A

Q.1 A vessel of length 130m, LCF = 63m. TPC = 12mt MCTC = 145 tm is at a draft of 5.20m fwd & 6.60m aft. She is to sail on E.K. draft of 6.48m. Space is available in No. 1 hold 50m fwd of the midship & No. 4 hold, 25m aft of COF. Calculate the amount cargo to be loaded in each space.

Q.2 M. V. Hindship is floating at a displacement of 19150t, KG 6.65m, FSC 0.042m, has yet to load 2 locomotives weighting 76t each, with her own gear. The first locomotive is placed on deck (quay side), Cg 13.83m above the base and 6m from CL. The derrick then plumbs the quay with its head 21.5m above the base and 13m from CL and lifts the second locomotive to be place on deck on the other side. Calculate the list when this locomotive is just picked up.

Q.3 Draw a labeled diagram of the <sup>transom</sup>transfer stern showing connections to the sternframe.

PART B

Q.4 Describe following stresses with diagrams :-

- i) Torsion.
- ii) Racking.
- iii) Panting.
- iv) Drydocking.

Q.5 Write short notes on the following:

- a) Role of Flag State and Port State Control mechanisms.
- b) Territorial Sea.

Q.6 What are the Load Line survey requirements and as a Third Officer, what items will you check while assisting the Chief Officer in preparing for an annual Load Line survey?

Q.7 What is situational awareness.

- a) Explain the role of classification societies?
- b) What is Safety Management System under ISM Code.

- a) Discuss about team work and leadership qualities.
- b) Prepare a Risk Assessment for hot work on the poop deck on a Tanker.



GOVERNMENT OF INDIA

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ON BOARD AT THE OPERATIONAL LEVEL

PAPER: SHIP CONSTRUCTION, STABILITY, SHIP SAFETY  
& ENVIRONMENT PROTECTION

TIME: 3 HOURS

PASS MARKS: 120

MAX. MARKS: 200

*06/09/2011*  
*[Signature]*

NOTES:

1. Question in Part - A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from Part - B and carry 25 marks each.

**PART - A**

Q. 1 A ship of displacement 7400t, KM 8.5m, KG 8.0m, lost some deck cargo from a position Kg 11.0m, 3.5m from centreline. If the resultant list was  $3.5^\circ$ , calculate the amount of cargo lost, if the FSM was 740 tn.

Q. 2 M.V. Hindship arrived in a port with drafts F-6.60m A-7.92m In RD of water there was 1.012. 2000t of cargo to be loaded in this port. Space available is no.2 hold. Calculate her final drafts Fwd & Aft.

Q. 3 Sketch and label a water cooled stern tube.

**PART - B**

Q. 4 a. State the purpose and contents of the following statutory documents as per MARPOL 73/78 - Oil Record Book, SOPEP Manual, and Garbage Management Plan.

b. As per STCW 2010 what is a rest period?

Q. 5 As per Code of Safe Working Practices, describe how the safety of ship's personnel is ensured by the following:

a) Safety committee

b) Permit to work system

Q. 6 With relevant sketches explain the different types of "STRESS", which a vessel encounters at sea.

Q. 7 Describe the functional requirement of ISM Code. In context of ISM Code what is a near miss and non-conformity?

Q. 8 Explain in brief contents of 'Five Titles' of MLC 2006.

Q. 9 "Feedback and acknowledgement are considered important component of communication process". Justify the statement with an onboard situation.



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**NOTES:**

1. Question in Part - A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from Part - B and carry 25 marks each.

**PART - A**

- Q. 1** M.V. Hindship displacing 16300t  $Kg=7.15m$ ,  $FSC = 0.09m$  discharged 300t,  $Kg=6.10m$ ,  $Cg=1.3m$  off the Centreline to Stbd and loaded 300t;  $Kg=6.1m$ ,  $Cg = 3.6m$  to Stbd of Centreline. A 150t parcel of cargo was shifted horizontally from 3.5m port of Centreline to 1.4m port of Centreline. Calculate the resultant list.
- Q. 2** A ship of displacement (W) 7400t,  $KM = 8.5m$ ,  $KG 8.0m$  lost some deck cargo kg. 11m & 3.5m from centre line. If the resultant list was  $3.5^\circ$ , calculate the amount of cargo lost, if FSM 800 tm
- Q. 3** Sketch and label the midship cross section of a LNG tanker (Moss Type).

**PART - B**

- Q. 4** a) Define following with respect to MARPOL:  
 i. Special area  
 ii. Nearest land  
 iii. Garbage  
 iv. Sewage  
 b) Explain the discharge criteria for machinery space bilges within special area as per MARPOL Annex - I.
- Q. 5** a) Describe the precautions you would take when painting draft marks.  
 b) Draw up a safety checklist for 'WORKING OVERSIDE' as per Code of Safe Working Practices.
- Q. 6** a) As per Chapter III of SOLAS 1974 as amended list 5 items required to be mentioned in the Shipboard Muster list.  
 b) List the purpose and functions of the Shipboard Health and Safety Committee.

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- Q.7. (a) Define:**
  - i) Camber ii) Sheer iii) Flare**
  - (b) What is the function of a staler plate. Explain with a suitable sketch.**
  
- Q. 8 a) Explain the role of Classification Societies in the Shipping Industry.**
  - b) Explain the Importance of ISM code in the Marine Industry.**
  
- Q. 9 a) Describe the essential attributes of effective team leader.**
  - b) As an OOD, how will you organize personnel for cargo operation and completion of company checklist**

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**GOVERNMENT OF INDIA**

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**NOTES:**

1. Question in Part - A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from Part - B and carry 25 marks each.

**PART - A**

- Q. 1 M.V Hindship is floating at a draft of fwd 5.62m, aft 6.78m in S.W. A weight of 330 t is then shifted from No 4 TD to No2 LH. Calculate her final drafts Fwd and Aft.
- Q. 2 An oil tanker 150m long, displacement 12500 tons, MCTC 200, leaves port with drafts 7.2m Fwd and 7.4m Aft. There is 550 tons of fuel oil in the forward deep tank (centre of gravity 70m forward of the centre of flotation) and 600 tons in the after deep tank (centre of gravity 60m aft of centre of flotation). The centre of flotation is 1m aft of amid ships. During the sea passage 450 tons of oil is consumed from aft find how much oil must be transferred from the forward tank to the after tank if the ship is to arrive on an even keel.
- Q. 3 Draw and label a mid-ship cross section of double hull oil tanker.

**PART - B**

- Q. 4 a) Explain with a block diagram the sewage treatment plant.  
b) With respect of Annex-IV of Marpol 73/78 describe the discharge criteria.
- Q. 5 Explain why there is a loss of strength at Hatch openings and what the constructional features to compensate for same are. Draw relevant sketches to support your answer
- Q. 6 As per 'Code of safe working practices' explain the precautions to be taken for  
a) Painting of Funnel b) Handling of batteries.
- Q. 7 a) Explain the role of classification societies in the Maritime Industry.  
b) With respect to UNCLOS explain base line, continental shelf and EEZ.
- Q. 8 a) If your vessel in security level no. 1, what precautions will be required?  
b) How will you prepare your vessel for Safety Equipment Survey?
- Q. 9 What is the need to regulate "Rest Hours" onboard? Describe minimum rest hour's requirement as per MLC 2006.

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NOTES:

1. Question in Part - A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from Part - B and carry 25 marks each.

**PART - A**

- Q. 1 M.V. Hindship floating in water of R.D. 1.012 at drafts F: 5.16m and A: 6.02m. She pumps out entire SW ballast from No. 1 and No. 4 (P, C and S) D.B. tanks. No. 3 (P and S) and No. 5 D.B. tanks which were empty are filled with H.F.O. Calculate:
- a) Maximum quantity of cargo that can be loaded so that the vessel will be at summer draft on reaching the open sea. Fuel and water consumption for river passage is 70 Ts.
  - b) GM (F) in docks if in departure condition  $KG = 8.75m$ ,  $FSM = 1450$ .
- Q. 2 A box shaped vessel length 130m beam 17m is floating in water of RD 1.010 at an even keel draft of 6.1m. She then loads the following cargoes:  
150 tonnes of cargo at 20m forward of mid-ships and  
210 tonnes of cargo at 30m aft of mid-ships.  
Calculate her final fore and aft drafts in S. W.
- Q. 3 Sketch & label a neat diagram of fore peak tank.

**PART - B**

- Q. 4
- a) Explain the different categories of the noxious liquid substances as per annex II of MARPOL.
  - b) Explain the discharge criteria of NLS in special areas and other areas as per MARPOL Annex - II.
- Q. 5
- a) Describe the composition of safety committee and the agenda for a monthly safety committee meeting.
  - b) Explain the precautions to be taken during ballast water exchange at sea.
- Q. 6 Describe code of safe working practices on board the ship.
- a) When painting shipside
  - b) While working on the radar scanner.
- Q. 7 With the help of neat sketches describe the different types of Rudder stating their advantages and disadvantages if any.
- Q. 8
- a) Explain briefly the important elements of SOLAS Chapter XI-2, special measures to enhance maritime security.
  - b) In the context of ISM code explain:
    - i) Objectives of SMS
    - ii) Near Miss
    - iii) Non - Conformity
- Q. 9
- a) Explain the situational awareness. How situational awareness reduces the possibility of human errors?
  - b) Explain the key elements of effective resource management?

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**GOVERNMENT OF INDIA**

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*Jan '2016*

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**PASS MARKS: 120**

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**NOTES:**

1. Question in Part – A are compulsory and carry 25 marks each.
2. Attempt any 5 out of the 6 questions from Part – B and carry 25 marks each.

**PART - A**

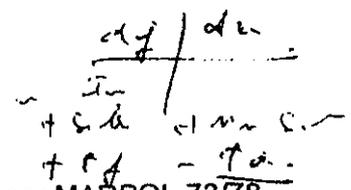
**Q. 1** M.V.'Hindship' loading in dock water of relative density 1.018 is on an even keel draft of 8.4m, with a GM (Solid) of 0.45m. She is to sail on an even keel at her summer draft in SW. Space was allocated for the following parcel:

400t in No.2	kg 11m	LCg 107m
350t in No.4	kg 9.8m	LCg 53m
650t in No.5TD	kg 10m	LCg 18m

The remaining cargo is to be loaded in No.1, kg 5.5m, LCg 122m and No 5 Hold kg 6m, LCg 15m. Calculate the amount to be loaded in each of these spaces and the final GM (Fluid) of the vessel, if her FSM was 2500tm.

**Q. 2** A Ship 116m long is floating at draft 6.5m for'd and 7.8m aft. The centre of floatation is 2.5m aft of amidships. TPC 18, MCTC 196tm. Find the new draft if a weight of 250 tonnes is loaded in a position 44m forward of midships & 300t is loaded 20m aft of mid ships.

**Q. 3** Draw and label a mid-ship cross section of a Bulk carrier.



**PART - B**

**Q. 4** State the functions of the following Statutory documents as per MARPOL 73/78  
a) Oil Record Book. b) SOPEP Manual c) Garbage Management Plan

**Q. 5** a) Explain the function of oily water separator and oil discharge monitoring and control system.  
b) Describe the permit to work systems being followed on the ship.

**Q. 6** What safety precautions would you observe during electric arc welding operation on board your ship.

**Q. 7** a) The importance of transverse watertight bulkheads plays in the construction of ship.  
b) The advantages of corrugated bulkheads with normal one.

**Q. 8** With respect to maritime legislation write short notes on:  
a) Territorial waters b) Exclusive Economic Zone (EEZ)

**Q. 9** a) What should be the qualities of Team Leader?  
b) Explain the need for situation and risk assessment on board the ship.

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