

***(Paper Format)***

Duration: 3 hrs.

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

Maximum Marks: 200

Pass Marks: 120

**CARGO HANDLING AND STOWAGE**

- Note:
1. Question 1 and 2 are compulsory.
  2. Answer any SIX out of remaining EIGHT questions.
  3. All questions carry equal marks

1. CARGO CALCULATIONS (STOWAGE FACTOR/ BROKEN STOWAGE/ LOAD DENSITY OR TANKER)
2. TACKLE CALCULATIONS/ CALCULATE DISPLACEMENT OF THE SHIP GIVEN SIX SIDED DRAFTS AND DENSITY OF WATER USING HYDROSTATIC TABLES (USING QUARTER MEAN DRAFT).
3. CRUDE / PETROLEUM PRODUCT (INCLUDING INERTING/ COW PROCEDURES- HAZARDS AND PRECAUTIONS)
4. LIQUID CHEMICALS CARGO INCLUDING HAZARDS, PROPERTIES AND PRECAUTIONS WITH RESPECT TO IBC CODE, LIQUEFIED GAS CARGOES INCLUDING HAZARDS, PROPERTIES AND PRECAUTIONS WITH RESPECT TO IGC CODE
5. IMDG CODE INCLUDING IMDG CONTAINERS, MFAG, EmS
6. BULK CARGOES: GRAIN/ HIGH DENSITY/COAL CARGOES
7. CODE FOR SAFE PRACTICES (TIMBER / IMSBC / BLU / SECURING)
8. CONTAINER/ Ro-Ro CARGOES, PCC, PTC,
9. REFRIGERATED / GENERAL CARGO / DECK CARGO / HEAVY LIFT
10. DAMAGE TO CARGO SPACES – INSPECTION & REPORTING / CARGO GEAR INSPECTION

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.



**GOVERNMENT OF INDIA**

**PM Paper**

**Date: - 8<sup>th</sup> Nov-2025**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours  
200**

**PASS MARKS: 120**

**MAX. MARKS:**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tank of length 32m x 18m x 11.5m contains water to a sounding of 10 cms. Crude oil of density 0.8350 at 15° C in vacuum was loaded in tank at 25° C, also 3 percent volume of tank was left for expansion throughout the voyage. If maximum temperature during voyage is 34° Celsius.

i) Find ullage at load port.

ii) The quantity of the cargo loaded.

(Assume there is no change in the volume of water due to change of temp)

**Q.2** A gyn tackle rigged to disadvantage, is used to lift a weight of 6 T, using a polypropylene rope. What will be the minimum diameter of the rope required to lift the weight. Assume friction is 10%. Safety Factor 6.

**Q.3** Using a block diagram briefly describe the Insert Gas System (IGS) on board oil tankers.

**Q.4** Explain various methods of venting of tanks on tankers. Sketch and give details of Pressure / vacuum valves.

**Q.5** a) How is packing and labeling of dangerous goods to be carried out as per IMDG Code?

b) List the classes of dangerous goods as per IMDG Code.

**Q.6** What are the hazards associated with coal? What are the precautions to be taken during its carriage?

**Q.7** Discuss in details about how the IMSBC code and BLU code assists the mariner.

**Q.8** a) Draw five different types of slings used in cargo handling.

b) Explain the Bay-Row Tier method of identifying containers on a container vessel.

**Q.9** a) Differentiate between ship's sweat and cargo sweat?

b) A ship is loading rice cargo in winter in U.K. & destination is Mombassa (Kenya). How the ventilation is to be carried out for this cargo while on passage.

**Q.10** Explain the purpose of 'enhanced survey programme', CAS and CAP. How it helps in detecting and rectifying damages within cargo holds?

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**GOVERNMENT OF INDIA**

PM Paper

Date: - 7<sup>th</sup> July-2025

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
  2. All Questions carry equal marks (i.e. 25 Marks each).
- 

**Q.1** A tween deck of dimensions 9m x 6m x 4m has a permissible load density of 3.10 t/m<sup>3</sup>. Steel pipes (S.F. 1.05m<sup>3</sup>/t) and Lub. Oil drum (S.F. 1.85m<sup>3</sup>/t) are to be loaded in the tween deck to fill all available space. Find maximum quantity of steel pipes and drums that can be loaded without exceeding load density.

**Q.2** A tween deck of dimensions 15m x 15m x 4m has a permissible load density of 5T/m<sup>2</sup>. Steel billets S.F. 0.35 m<sup>3</sup>/T and General cargo S.F. 4.0 m<sup>3</sup>/T are to be loaded to fill all the available space. Find the maximum quantity of steel billets and General cargo so that the permissible load density is not exceeded.

**Q.3** Draw label and describe the Inert Gas system used on a crude oil tanker.

**Q.4** a) What are the hazards associated with the carriage of liquefied gas cargoes on ships?  
b) Describe the various categories of chemical cargoes transported in bulk by sea.

**Q.5** A Container loaded 'on deck' containing IMDG cargo was found to be dripping some of its cargo. A deck hand, who sent to clean the same. Inhaled toxic fumes and collapsed. What actions are required to be taken on board with respect to safety, health and pollution prevention?

**Q.6** Describe the hazards associated with high-density cargoes as per the IMSBC code.

**Q.7** a) Enumerate precautions to be observed when loading Timber cargo on deck.  
b) Describe with a suitable sketch the lashings required for timber deck cargoes.

**Q.8** a) How will you prepare the car decks for the loading of trailers and vehicles?  
b) List the various lashing materials used in securing containers on a container vessel.

**Q.9** Describe the preparation and precautions to be taken for the carriage of Refrigerated Cargo.  
a) prior loading                      b) during loading                      c) during transit                      d) during discharging

**Q.10** What is the importance of Chain register? What are the regulations for testing and examination of cargo gears, derricks and cranes as per Dock Labour Act.

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**GOVERNMENT OF INDIA**

AM Paper

Date: - 7<sup>th</sup> July-2025

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A boxed shaped tank of dimension 40 m × 30 × 20 mtrs and had an ullage of 1.57 mtrs of oil cargo at 24°C. A cargo of 4500 mt (in air) of cargo discharged at 1<sup>st</sup> discharge port and remaining cargo at 2<sup>nd</sup> discharge port. Find the ullage upon departure from 1<sup>st</sup> discharge port if the temperature of cargo expected on departure is 29°C. Height of ullage port above deck is 0.45 mtrs and density of oil at 15°C in vacuum is 0.8400 t/cbm. (Use ASTM tables).

**Q.2** A GYN Tackle reeved to advantage & a luff tackle reeved to disadvantage are together used to lift a load of 8 T. The weight is suspended from the GYN tackle whose hauling part is secured to the moving block of the luff tackle. If single movable friction is 6 x 37 wire to be used in GYN tackle & Nylon rope in Luff tackle. Take friction on each block as 13%. Calculate effort, Size of wire & rope and efficiency of the system.

**Q.3** Sketch, label and describe the Inert Gas system used on a Crude Oil tanker.

**Q.4 a)** What are the hazards associated with carriage of Liquefied gas cargoes by sea?

**b)** Describe the various categories of chemical cargoes transported in bulk by sea. Give two examples of each.

**Q.5 a)** Explain in short the following with diagram where necessary:

i) Stack height (line)

ii) CSC plate

iii) Check digit

iv) Out of Gauge Containers

v) Cell guides

vi) Twin stackers

**b)** Draw a Bay plan & show the following on plan

i) 100084

ii) 090606

**Q.6** Describe the hazards associated with high-density cargoes as per the IMSBC code.

**Q.7 a)** Enumerate precautions to be observed while loading Timber cargo on deck.

**b)** Describe with a suitable sketch the lashings required for timber deck cargoes.

**Q.8 a)** How will you prepare the car decks for the loading of trailers and vehicles?

**b)** List the various lashing materials used in securing containers on a container vessel.

**Q.9** Describe the preparation and precautions to be taken for the carriage of Refrigerated Cargo.

a) Prior loading

b) during loading

c) during transit

d) during discharging

**Q.10** What is the importance of Chain register? What all information should be available for testing and examination of cargo gears, derricks and cranes?

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**GOVERNMENT OF INDIA**

**PM Paper**

**Date: - 6<sup>th</sup> May-2025**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A rectangular tank (20m x 15m x 10.6m) is loaded to ullage of 3.2m with oil of R.D. 0.8502 at 34°C. Find Minimum & Maximum percentage of filling during the voyage if the temperature changes between 20°C & 64°C. The ullage pipe extends 91 centimeters above the top of the tank (Density correction factor 0.0009/°C).

**Q.2** A tween deck of dimensions 18m x 15m x 4m has a permissible load density of 5T/m<sup>2</sup> Steel billets S.F. 0.35 m<sup>3</sup>/T and general cargo S.F. 4.0 m<sup>3</sup>/T are to be loaded to fill all the available space. Find the maximum quantity of steel billets and over stowed with General cargo so that the load density is not exceeded.

**Q.3** With respect to an Oil tanker explain:

- a) Ring main system                      b) Static accumulation                      c) Deck seal unit

**Q.4** a) Explain the role of Competent person under Dock safety regulations.

b) As officer in charge of cargo watch, what are the checks you will perform on cargo gear prior allowing its use?

**Q.5** With respect to IMDG Code, explain:

- a) Stowage                      b) Segregation "Away from"                      c) UN number                      d) MFAG                      e) EMS

**Q.6** a) What are the hazards associated with carriage of concentrates and how these are overcome on board a general cargo ship?

b) What precautions are stated in the IMSBC code regarding loading of high-density cargoes in bulk?

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

- a) Cargo securing manual and                      b) Effect of heavy deck cargo on stability of ship.

**Q.8** Describe the various types of containers based on size, material of construction and usage.

**Q.9** Sketch where necessary and describe any 3,

- a) Centrifugal Pump                      b) Eductor                      c) Bundling of Grain Cargo                      d) Explosimeter

**Q.10** What are various types of Corrosion and how is it taken care of on ships?

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**GOVERNMENT OF INDIA**

AM Paper

Date: - 6<sup>th</sup> May-2025

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A boxed shaped tank of dimensions 40 x 30 x 20 mtrs had an ullage of 1.57 mtrs of oil cargo at 24°C. 4500 mt (in air) of cargo discharged at 1<sup>st</sup> discharge port and remaining cargo at 2<sup>nd</sup> discharge port. Find the ullage upon departure from 1<sup>st</sup> discharge port if the temperature of cargo expected on departure is 29°C. Height of ullage port above deck is 0.45 mtrs and density of oil at 15°C in vacuum is 0.8400 t/cbm. (Use ASTM tables).

**Q.2** A Hold 10 x 10 x 9 m is to be loaded with a steel plates (SF 2.13 m<sup>3</sup>/t) and steel coils (SF 1.83 m<sup>3</sup>/t). If the load density of the Tank Top is 4.5/m<sup>2</sup>. Calculate individually:

- i) How many tonnes of steels plates and steel coils can be loaded.
  - ii) The maximum height of both types of cargo.
- b) A 6 x 12 wire 20 mm has 6 wires broken in a length of 17.5 cms, will you condemn the wire?

**Q.3** Sketch, label and describe the Inert Gas system used on a Crude Oil Tanker.

- Q.4** a) Explain the role of Competent authority under Dock Safety regulations.  
b) What are safety check to be carried out prior commencement of cargo operations using Derrick.

- Q.5** a) Sketch and describe a Bay plan of a container ship.  
b) Describe the various lashing and securing items for securing container on hatch tops of a container ships.

**Q.6** With respect to IMDG cargo briefly explain:

- |            |                            |              |
|------------|----------------------------|--------------|
| a) Stowage | b) Segregation "Away from" | c) UN number |
| d) MFAG    | e) EMS                     |              |

**Q.7** WRT carriage of grain cargo write short notes on the following:

- i) Strapping and Lashing
- ii) Bundling
- iii) Document of Authorization

**Q.8** As per BLU Code (Code of practice for the safe Loading and unloading of Bulk carrier) prepare a ship/ shore safety checklist for loading a dry bulk cargo carrier.

- Q.9** a) How will you lash Cars on a container flat rock?  
b) How will you carry out maintenance on Bow door on RORO vessel?

- Q.10** a) List the contents of register of lifting appliances and cargo handling gear (Chain register).  
b) Explain the causes of corrosion in cargo and ballast tanks.

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# GOVERNMENT OF INDIA

AM Paper

Date: - 10<sup>th</sup> Mar-2025

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A cylindrical tank of diameter 8m is 10m high. 400 tonnes of oil of density 0.900 @15°C in vacuum is to be loaded at in the tank 28°C. Find the ullage at load port and ullage during the voyage - if its temperature rises to 38°C. (Given  $\pi = 3.1416$ ) (Use ASTM table).

**Q.2** A weight of 15T is being lifted by a three-fold purchase, rigged to advantage. What minimum size of 6 × 37 wire rope can be used for the purchase if friction per sheave is 8% of weight? Find the efficiency of the system.

**Q.3** What is an Inert gas? Draw a schematic diagram with an explanation of components of IG system on an oil tanker.

**Q.4** a) Explain the aim and purpose of IGC Code and hazards associated with the carriage of liquefied gases at sea.

b) Describe types of gas tankers and different methods of liquefaction of gas-on-gas carriers.

**Q.5** a) State the various classes of Dangerous goods as per IMDG Code.

b) Describe the use of segregation tables as per IMDG. How are various classes of dangerous goods segregated?

**Q.6** What are the preparations of cargo hold & precautions to be taken while loading grain in bulk?

**Q.7** a) Sketch and describe the securing and lashing arrangement of containers.

b) Explain the information provided on the CSC plate of containers.

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

i) Angle of repose.

ii) Objectives & aim of BLU Code.

iii) Flow Moisture Point & Transportable Moisture Limit.

iv) Bundling of grain cargo.

**Q.9** a) Write a short note on Dock Safety Regulations.

b) List all checks you will do prior to putting a cargo gear for use for lifting heavy lifts.

**Q.10** Describe the hazards associated with stowage, lashing, and securing of timber deck cargoes set out in the Code of Safe Practices for ships carrying Timber deck cargoes.

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**GOVERNMENT OF INDIA**

**PM Paper**

**Date: - 10<sup>th</sup> Mar-2025**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A cylindrical tank of diameter 8m is 10m high. 400 T of oil density 0.900 at 15°C in vacuum is to be loaded in the tank at 28°C. Find the ullage at load port during the voyage - if its temperature rises to 38°C. (Given  $\pi = 3.1416$ ) (Use ASTM table).

**Q.2** A weight of 13T is to be lifted using a 2-fold purchase rigged to disadvantages. The hauling part of this purchase is secured to the moving block of Gun tackle rigged to advantage. Calculate:

- a) Effort required to lift the load.
- b) Efficiency of the system.
- c) Size of Nylon rope required for the Gun tackle.

(Given - factor of safety: 6, Friction: 8% of weight per sheave, velocity ratio of system equals product of individual velocity ratios).

**Q.3** a) State and describe the hazards involved in carriage of cargo on Gas Tankers.

b) With respect to an oil tanker, explain the purpose and working of Wet Deck Seal Unit.

**Q.4** Sketch and describe the Direct and Ring main system of pipe lines of Oil tankers.

**Q.5** With respect to IMDG Code, explain:

- a) Segregation of IMDG Cargo.
- b) MFAG
- c) EMS

**Q.6** With respect to the carriage of grain in bulk, explain:

- a) Document of Authorization
- b) Bundling
- c) How heeling moments are reduced when loading grain in bulk.

**Q.7** As per BLU Code (Code of Practice for the Safe Loading and Unloading of Bulk Carrier), prepare a ship/shore safety checklist for loading a dry grain in bulk cargo carrier.

**Q.8** a) Sketch and describe a bay plan of a container ship.

b) Describe the lashing and securing systems on container ships.

**Q.9** Describe with the aid of neat labelled sketches, securing of a locomotive on a multipurpose ship as per Code of Safe Practice for cargo stowage and securing.

**Q.10** a) Write notes on Chain Register.

b) Describe the following: Competent person, Competent Authority, Responsible person & entries are to be made in Part 1, Part 2, Part 3 of the chain register.

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**GOVERNMENT OF INDIA**

**PM Paper**

**Date: - 04<sup>th</sup> Jan-2025**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
  2. All Questions carry equal marks (i.e. 25 Marks each).
- 

**Q.1** A tank of length 32m x 18m x 11.5m contains water to a sounding of 10 cms. Crude oil of density 0.8350 at 15°C in vacuum was loaded in tank at 25°C. Also 3 percent volume of tank was left for expansion throughout the voyage. If maximum temperature during voyage is 34°Celsius:

- i) Find ullage at load port.
  - ii) The quantity of the cargo loaded.
- (Assume there is no change in the volume of water due to change of temp.)

**Q.2** A hold 10 x 10 x 9m is to be loaded with steel plates (SF 2.05 M<sup>3</sup>/T) and steel coils (SF 1.86 M<sup>3</sup>/T). If the load density of the tank top is 4.5 t/m<sup>2</sup> calculate:

- a) How many tonnes of each cargo can be loaded?
- b) The height of both types of cargo.

**Q.3** Using a block diagram, briefly describe the Insert Gas System (IGS) on board oil tankers.

- Q.4** a) Explain the different types of Liquefied Gas Carriers.  
b) What special type of cargo tanks are found most suitable for LNG carriage? List the reasons for the same.

**Q.5** What is the aim of IMDG Code? What are the classifications of dangerous goods as per the code?

- Q.6** a) Write short note on DOA (Document of Authorization) as per Grain Code and the conditions which must be fulfilled to load bulk grain without DOA.  
b) Enumerate how a ship's hold will be prepared to load grain?

**Q.7** What are the stability criteria for loading timber cargo? Explain how you will lash the timber cargo on deck as a duty officer.

- Q.8** a) Sketch and describe securing and lashing arrangement of container.  
b) Describe the procedure for closing and securing of bow doors on a Ro-Ro vessel.

- Q.9** a) What are the precautions to be observed before loading heavy lift using ship's gear?  
b) When will you condemn a wire rope?

**Q.10** What is a Chain Register & what are the entries recorded in it?

# GOVERNMENT OF INDIA

AM Paper

Date: - 04<sup>th</sup> Jan-2025

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** You have No.2 lower hold with bale capacity of 3000 CBM and No.2 tween deck with bale capacity of 2000 CBM to load the following cargoes for Singapore and Hong Kong in that order.

#### Cargoes for Singapore:

- 200 tonnes cloves in bags with SF 4 cubic meters per tonne
- 400 tonnes of machinery cases with SF 2 cubic per tonne

#### Cargoes for Hong Kong:

- 1000 tonnes of steel coils with SF 1.2 cubic meters per tonne
- 500 tonnes of tea in chests with SF 3 cubic meters per tonne
- 100 tonnes packages of electronic goods, with SF 3.5 cubic meters per tonne

Make a stowage plan taking into consideration the safety of the ship and cargo and smooth discharge at the subsequent ports.

**Q.2** A gyn tackle rigged to disadvantage is used to lift a weight of 6 T, using a polypropylene rope. What will be the minimum diameter of the rope required to lift the weight? Assume friction is 10%, Safety Factor 6.

**Q.3** With respect to an oil tanker, explain:

- a) Ring main system                      b) Static accumulation                      c) Deck Seal unit

**Q.4** Explain various methods of venting of tanks on tankers. Sketch and give details of Pressure / vacuum valves.

- Q.5** a) How is packing and labeling of dangerous goods to be carried out as per IMDG Code?  
b) List the classes of dangerous goods as per IMDG Code.

**Q.6** What are the hazards associated with coal? What are the precautions to be taken during its carriage?

**Q.7** Discuss in detail about how the IMSBC code and BLU code assist the mariner.

- Q.8** a) Draw five different types of slings used in cargo handling.  
b) Explain the Bay-Row Tier method of identifying containers on a container vessel.

- Q.9** a) Differentiate between ship's sweat and cargo sweat?  
b) A ship is loading rice cargo in winter in U.K. & destination is Mombassa (Kenya). How the ventilation is to be carried out for this cargo while on passage.

**Q.10** Explain the purpose of 'enhanced survey programme', CAS and CAP. How it helps in detecting and rectifying damages within cargo holds?

# GOVERNMENT OF INDIA

PM Paper

Date: - 07<sup>th</sup> Nov-2024

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A Tween deck of dimensions 9m x 6m x 4m has a permissible load density of 3.10t/m<sup>2</sup> Steel pipes (S.F. 1.05m<sup>3</sup>/T) and Lub. Oil drum (S.F. 1.85m<sup>3</sup>/t) are to be loaded in the tween deck to fill all available space. Find maximum quantity of steel pipes and drums that can be loaded without exceeding load density?

**Q.2 a)** A hold 10 x 10 x 9 m is to be loaded with steel plates (SF 2.13m<sup>3</sup>/t) and steel coils (SF 1.83m<sup>3</sup>/t). If the load density of the Tank Top is 4.5t/m<sup>2</sup>, calculate individually

i) How many tonnes of steel plates and steel coils can be loaded

ii) The maximum height of both types of cargo.

b) A 6 x 12 wire 20mm has 6 wires broken in a length of 17.5 cms, will you condemn the wire.

**Q.3** Draw label and describe the Inert Gas system used on a crude oil tanker.

**Q.4 a)** Explain the role of Competent authority under Dock safety regulations.

b) What are safety check to be carried out prior commencement of cargo operations using Derrick.

**Q.5 a)** Sketch and describe a Bay plan of a container ship.

b) Describe the various lashing and securing items for securing container on hatch tops of a container ships.

**Q.6** A container loaded 'on deck' containing IMDG cargo was found to be dripping some of it cargo. A deck hand, who went to clean the same inhaled toxic fumes and collapsed. What actions are required to be taken on board with respect to safety, health and pollution prevention?

**Q.7** WRT carriage of grain cargo write short notes on the following:

i) Strapping and Lashing

ii) Bundling

iii) Document of Authorization

**Q.8** As per BLU Code (Code of practice for the safe Loading and unloading of Bulk carrier) prepare a ship/ shore safety checklist for loading a dry bulk cargo carrier.

**Q.9 a)** How will you lash Cars on a Container flat rack?

b) How will you carry out maintenance on Bow door on RORO vessel?

**Q.10 a)** List the contents of register of lifting appliances and cargo handling gear (Chain register).

b) Explain the causes of corrosion in cargo and ballast tanks.

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**GOVERNMENT OF INDIA**

AM Paper

Date: - 07<sup>th</sup> Nov-2024

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A ship's hold has a bale capacity of 500m<sup>3</sup> and a grain capacity of 570m<sup>3</sup> and is filled with maize stowing at 1.25m<sup>3</sup>/t. It is now intended to discharge 100 tonnes of maize and load bagged maize in the same hold (B.S. of bagged maize is 11%). The bags are 0.5m x 0.4m x 0.3m and weigh 50kgs. What is the weight of bagged maize that can be loaded? (Assume bale capacity to grain capacity ratio constant through the entire hold).

**Q.2** A weight of 13T is to be lifted using a 2-fold purchase rigged to disadvantages. The hauling part of this purchase is secured to the moving block of Gun tackle rigged to advantage. Calculate:

- a) Effort required to lift the load
- b) Efficiency of the system
- c) Size of Nylon rope required for the Gun tackle.

(Given – factor of safety: 6, Friction: 8% of weight per sheave, velocity ratio of system equals product of individual velocity ratios).

**Q.3** A crude oil tanker has completed discharge of cargo and is now proceeding to a layup berth for some hot work to be carried out in two of her cargo tanks. Describe all the procedures you will follow to prepare the tanks for man entry. On completion of work how will you prepare the tanks again for loading?

**Q.4** What information is provided on Material Safety Data Sheet and explain various categories of cargoes on chemical tankers?

- a) Describe shipper's responsibilities for shipping dangerous goods as per IMDG code.
- b) What are the general precautions to be taken while loading explosive on board?

**Q.6** a) What are the hazards associated with carriage of concentrates and how these are overcome onboard a general cargo ship?

b) What precautions are stated in the IMSBC code regarding loading of high-density cargoes in bulk?

**Q.7** Describe hazards of carriage of TIMBER deck cargoes. Why those hazards are not present if some cargo is loaded inside the ship's hold?

**Q.8** a) What factors must be borne in mind for making a BAY PLAN for a container ship?

b) Write short notes on TARE weight & purpose of check digit of a container serial number.

**Q.9** How is the vessel prepared for loading refrigerated cargo?

**Q.10** a) What cargo gear inspection will you carry out for your cranes before commencing cargo work.

b) Describe the system of inspection & reporting (damage to cargo spaces) after all the cargo in hold is discharged.

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# GOVERNMENT OF INDIA

AM Paper

Date: - 09<sup>th</sup> Sept-2024

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A boxed shaped tank of dimensions 35 x 30 x 24 meters has to be loaded in such a way so that 3% of the volume of the tank will always be available for expansion. Temperature of oil at load port is 25°C. Maximum expected temperature during the voyage is 34°C. Height of ullage port is 0.48 mtrs. Determine of oil at 15°C in vacuum = 0.8650 t/cbm.

- Find:
- a) Determine load port ullage
  - b) Weight of cargo in air
  - c) Ullage in the tank if temperature unexpectedly goes up to 44 deg c during the voyage.

**Q.2** Prepare a stowage plan for loading in No.2 cargo hold based on the details given below: No. 2 LH capacity 1700m<sup>3</sup> and No.2 Tween Deck capacity 1410m<sup>3</sup> are to be loaded and then discharged at Singapore and Hongkong in that order. The area of LH and Tween deck is 15 x 10m. The load density of LH is 8t/m<sup>2</sup> and TDK is 5t/m<sup>2</sup>.

Following cargoes to be loaded:

CARGO	S.F.	WEIGHT (t)	DISCHARGE PORT
Ore	0.5	400	Hong Kong
Gunnies	1.7	500	Hong Kong
Rubber	2.0	100	Hong Kong
Tea Chest	3.0	80	Singapore
Machinery	2.0	70	Singapore
Gunnies	1.7	400	Singapore

In addition to above cargoes, find the maximum amount of optional cargo which can be loaded and its SF so that holds are full to their capacities.

**Q.3** Draw label and describe the Inert Gas system used on a crude oil tanker.

**Q.4** What are the hazards associated with sea transport of LPG / LNG cargoes in fully refrigerated gas tankers.

**Q.5** In IMDG code explain briefly the following:

- a) Marketing, Labelling & Place cards
- b) UN No.
- c) MFAG.

**Q.6** Briefly describe the guidelines given in the IMSBC code regarding loading of bulk cargoes.

**Q.7** What factors should be considered prior to loading deck cargo? Describe with suitable sketch the lashing required for timber deck cargo.

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

- a) Stowage factor and broken stowage.
- b) Cargo manifest
- c) Types, sizes and marking of containers.

**Q.9** Give detailed description on hold preparation for carriage of bagged rice cargo. Describe the precautions you will observe during and after loading.

**Q.10** What is the importance of a chain register? What all information should be available for testing and examination of cargo gears, derricks or cranes?

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**GOVERNMENT OF INDIA**

PM Paper

Date: - 08<sup>th</sup> July-2024

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A boxed-shaped tank of dimensions 35 x 30 x 24 mtrs is loaded with oil cargo up to an ullage of 3.47 mtrs at 24°C. Density of oil at 15°C in vacuum is 0.8450 t/cbm and location of ullage port above deck is 0.45 mtrs. Find up to what temperature this oil can be heated so that ullage in the tank will not fall below 3.34 mtrs. (Use ASTM tables).

**Q.2** A ship of 3520 t deadweight has onboard 420T of stores and bunkers and 70T of water. Stow Timber (S.F. 1 m<sup>3</sup>/T) and Rolls of paper (S.F. 3.4 m<sup>3</sup>/T) to fill the ship. The hold capacities are: No. 1 – 1550 m<sup>3</sup>, No. 2 – 1585 m<sup>3</sup>, No. 3 – 1250 m<sup>3</sup> and No. 4 – 1015 m<sup>3</sup> resp. State the distribution of each cargo in each of the space.

**Q.3** A Crude oil tanker, after completing her discharging at a port, is on her ballast voyage. One of the valves in a tank detected to be leaking requires maintenance and necessitates tank entry. Explain the procedure to:

- a) Prepare the tank for man entry
- b) After the completion of repair, explain how you would prepare the tank for loading.

**Q.4** Write short notes on:

- |                           |  |                 |
|---------------------------|--|-----------------|
| a) Category X cargo       | b) Type II Chemical tanker                   | c) SMPEP manual |
| d) Certificate of Fitness | e) Other substances as per Annex 2 of MARPOL |                 |

**Q.5** With reference to the IMDG code, what all information are provided in part 3 of the code. What are the precautions you will take during your cargo watch when loading cargo?

**Q.6** a) Explain the following with diagram where necessary.

- |                 |               |                              |
|-----------------|---------------|------------------------------|
| i) Stack height | ii) CSC plate | iii) Out of Gauge Containers |
|-----------------|---------------|------------------------------|
- b) Draw a bay plan & explain the following:
- |           |            |
|-----------|------------|
| i) 100084 | ii) 090606 |
|-----------|------------|

**Q.7** a) Cargo of Fertilizers is to be loaded on Board your vessel. The last cargo carried was Iron Ore. How will you prepare your Hatches for loading Fertilizers in bulk?

b) After completion of discharged of Fertilizers it is observed that the Air pipe is damaged by stevedore's make a 3<sup>rd</sup> party damage report.

**Q.8** a) What are the precautions to be taken when operating Bow doors of Ro-Ro ships?

b) Explain how will you get your reefer hold ready for loading apples?

**Q.9** a) How will you secure a heavy lift cargo loaded on deck.

- b) Write short notes on: i) Purpose and use of dunnage      ii) Shoring      iii) Side battens

**Q.10** What are various types of Corrosion and how is it taken care of on ships?

**GOVERNMENT OF INDIA**

AM Paper

Date: - 08<sup>th</sup> July-2024

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A cylindrical tank of diameter 8m is 10m high. 400 tonnes of oil of density 0.900 @ 15°C in vacuum is to be loaded at in the tank at 28°C. Find the ullage at load port and ullage during the voyage – if its temperature rises to 38°C. (Given  $\pi = 3.1416$ ) (Use ASTM table).

**Q.2** A hold 10 x 10 x 9m is to be loaded with steel plates (SF 2.05 M<sup>3</sup>/t) and steel coils (SF 1.86m<sup>3</sup>/t). If the load density of the tank top is 4.5t/m<sup>2</sup>. Calculate:

- a) How many tonnes of each cargo can be loaded?
- b) The height of both types of cargo.

**Q.3** What respect to an oil tanker explain:

- a) Ring main system
- b) Static accumulation
- c) Deck Seal unit.

**Q.4** Explain various methods of venting of tanks on tankers. Sketch and give details of Pressure / vacuum valves.

**Q.5 a)** State the various classes of Dangerous goods as per IMDG Code.

b) Describe the use of segregation tables as per IMDG. How are various classes of dangerous good segregated?

**Q.6 a)** Write short note on DOA (Document of Authorization) as per Grain Code and the conditions which must be fulfilled to load bulk grain without DOA.

b) Enumerate how a ship's hold will be prepared to load grain?

**Q.7** Describe the hazards associated for stowage, lashing and securing of Timber deck cargoes as set out in Code of Safe practices for ships carrying Timber deck cargoes.

**Q.8 a)** Sketch and describe securing and lashing arrangement of container.

b) Describe the procedure for closing and securing of bow doors on a Ro-Ro vessel.

**Q.9 a)** What are the precautions to be observed before loading heavy lift using ships gear?

b) When will you condemn a wire rope?

**Q.10 a)** Write short notes on Dock Safety Regulations.

b) List all checks you will do prior putting a cargo gear for use for lifting heavy lifts.

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**GOVERNMENT OF INDIA**

**Paper 2**

**Date: - 06<sup>th</sup> May-2024**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A GYN Tackle reeved to advantage & a luff tackle reeved to disadvantage are together used to lift a load of 8T. The weight is suspended from the GYN tackle whose hauling part is secured to the moving block of the luff tackle. Find minimum size of 6 x 37 wire to be used in GYN tackle & Nylon rope in Luff tackle. Take friction on each block as 13%. Calculate effort, Size of wire & rope and efficiency of the system.

**Q.2** A rectangular tank (20m x 15m x 10.6m) is loaded to ullage of 3.2m with oil of R.D. 0.8502 at 34°C. Find minimum & maximum percentage of filling during the voyage if the temperature changes between 20°C & 64°C. The ullage pipe extends 91 centimeters above the top of the tank (Density correction factor 0.0009/°C).

**Q.3** With respect to an Oil tanker explain:

- a) Ring main system                      b) Static accumulation                      c) Deck seal unit

**Q.4 a)** Explain role of Competent person under Dock safety regulations.

b) As officer in charge of cargo watch, what are the checks you will perform on cargo gear prior allowing its use?

**Q.5 a)** Explain in short the following with diagram where necessary.

- i) Stack height                                      ii) CSC plate                                      iii) Check digit  
iv) Out of Gauge Containers                      v) Cell guides                                      vi) Twin stackers

b) Draw a Bay plan & show the following on plan:

- i) 100084                                      ii) 090606

**Q.6 a)** What are the hazards associated with carriage of concentrates and how these are overcome on board a general cargo ship?

b) What precautions are stated in the IMSBC code regarding loading of high-density cargoes in bulk?

**Q.7** Sketch where necessary and describe any 3:

- a) Centrifugal pump                      b) Eductor                      c) Bundling of Grain Cargo                      d) Explosimeter

**Q.8** What are various types of Corrosion and how is it taken care of on ships?

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

**GOVERNMENT OF INDIA**

**Paper 1**

**Date: - 06<sup>th</sup> May-2024**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
  2. All Questions carry equal marks (i.e. 25 Marks each).
- 

**Q.1** A tank measuring 21m x 16m x 16m has an ullage port extending 0.8m above the top of the tank. It is to be located with crude oil at 24 deg Celsius 2% of the tank volume is to be left for expansion when maximum temperature expected during the voyage is 40 deg Celsius.

(Density of oil = 0.820 @ 15 deg Celsius in vacuum) (Use ASTM tables).

Find the:

- a) Mass of oil located
- b) Ullage at load port.

**Q.2** A derrick fitted with 2-fold purchase used to advantages is to lift a load of 26 T. The cargo runner wire is rove through the lead blocks on derrick head and heel on the way to the winch. What will be the size of wire (6x24) to be used when Factor of Safety is 6 and Friction is 8%. What will be the efficiency of the system?

**Q.3** Draw, label and describe the Inert Gas system used on a crude oil tanker.

**Q.4** Explain the precautions to be taken with respect to loading / discharging of Liquified Gas cargoes with respect to IGC code.

**Q.5 a)** Describe IMDG Dangerous Cargo Manifest.

b) Explain Packing, Marking, Labelling and Placarding requirements of dangerous goods packed from with respect to IMDG Code.

**Q.6** With respect to carriage of grain in bulk, explain the hazards associated with it. Describe the preparation of hold for loading bulk grain.

**Q.7 a)** What is the purpose of Code of safe practice for Cargo Stowage and Securing?

b) What are the principles of safe stowage & securing as per above code.

**Q.8 a)** With a suitable sketch show the markings on a container including information on CSC plate.

b) How is the position of a container identified using bay plan.

**Q.9** What precautions will you observe before and during the loading of a refrigerated cargo? State the difference between 'Frozen' and 'Chilled' cargoes with examples.

**Q.10 a)** Write short notes on Dock Safety Regulations.

b) As Officer in charge of cargo watch, what are the checks you will perform on cargo gear prior allowing its use?

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**GOVERNMENT OF INDIA**

Date: - 06<sup>th</sup> Mar-2024

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A Tween deck of dimensions 9m x 6m x 4m has a permissible load density of 3.10 t/m<sup>2</sup> Steel pipes (S.F. 1.05m<sup>3</sup>/T) and lub. Oil drum (S.F. 1.85m<sup>3</sup>/t) are to be loaded in the tween deck to fill available space. Find maximum quantity of steel pipes and drums that can be loaded without exceeding load density?

**Q.2** A weight of 13T is to be lifted using a 2-fold purchase rigged to disadvantages. The hauling part of this purchase is secured to the moving block of Gun tackle rigged to advantage. Calculate:

- a) Effort required to lift the load.
- b) Efficiency of the system.
- c) Size of Nylon rope required for the Gun tackle.

(Given - Factor of safety: 6 Friction: 8% of weight per sheave, velocity ratio of system equals product of individual velocity ratios).

**Q.3** Sketch and describe the general arrangement of oil tanker showing typical location of cargo tanks, slops tanks, cofferdams and pump room.

- Q.4** a) What are the hazards associated with carriage of liquefied gas cargoes?  
b) Explain the precautions to be taken in gas tankers with respect to IGC Code?

- Q.5** a) How is packing and labelling of dangerous goods to be carried out as per IMDG Code?  
b) List the classes of dangerous goods as per IMDG Code.

**Q.6** With respect to the carriage of grain in bulk, explain:

- a) Document of Authorization
- b) Bundling
- c) How heeling moments are reduced when loading grain in bulk.

**Q.7** As per BLU Code (Code of practice for the safe Loading and unloading of Bulk carrier). Prepare a 'ship/ shore safety checklist' for loading a dry bulk cargo carrier.

- Q.8** a) Sketch and describe a bay plan of a container ship.  
b) Describe the lashing and securing systems on container ships.

**Q.9** Describe with the aid of neat labelled sketches, securing of a locomotive on a multipurpose ship as per 'Code of safe practice' for cargo stowage and securing.

**Q.10** Write notes on Chain Register. Describing the following:

Competent person, Competent Authority, Responsible person & entries are to be made in Part 1, Part 2, Part 3 of the chain register.

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**GOVERNMENT OF INDIA**

**PM PAPER**

**Date: - 8<sup>th</sup> Jan-2024**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
  2. All Questions carry equal marks (i.e. 25 Marks each).
- 

**Q.1** A boxed shaped tank of dimensions 35 x 30 x 24 m is loaded with oil cargo up to an ullage of 3.47m at 24°C. Density of oil at 15°C in vacuum is 0.8450 t/m<sup>3</sup> and location of ullage port above deck is 0.45m. Find up to what temperature this oil can be heated so that ullage in tank will not fall below 3.34m (use ASTM tables).

**Q.2 a)** A Hold 10 x 10 x 9m is to be loaded with steel plates (SF 2.13m<sup>3</sup>/t) and steel coils (SF 1.83m<sup>3</sup>/t). If the load density of the Tank Top is 4.5t/m<sup>2</sup>, calculate individually

- i) How many tonnes of steel plates and steel coils can be loaded.
  - ii) The maximum height of both types of cargo.
- b) A 6 x 12 wire 20mm has 6 wires broken in a length of 17.5 cms will you condemn the wire.

**Q.3** Explain the purpose, precautions and advantages of crude oil washing on a tanker.

- Q.4 a)** Explain the role of Competent authority under Dock safety regulations.
- b) What are safety check to be carried out prior commencement of cargo operation using Derrick.

- Q.5 a)** Sketch and describe a Bay plan of a container ship.
- b) Describe the various lashing and securing items for securing container on hatch tops of a container ships.

**Q.6** WRT, IMDG explain:

- a) Segregation of cargo
- b) Packing and labelling

**Q.7** WRT carriage of grain cargo write short notes on the following:

- i) Strapping and Lashing
- ii) Bundling
- iii) Document of Authorization

**Q.8** As per BLU Code (Code of practice for the safe Loading and unloading of Bulk carrier) prepare a ship / shore safety checklist for loading a dry bulk cargo carrier.

- Q.9 a)** How will you lash Cars on a container flat rack?
- b) How will you carry out maintenance on Bow door on RORO vessel?

- Q.10 a)** List the contents of register of lifting appliances and cargo handling gear (Chain register).
- b) Explain the causes of corrosion in cargo and ballast tanks.

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**GOVERNMENT OF INDIA**

**AM PAPER**

**Date: - 08<sup>th</sup> Jan-2024**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A cylindrical tank of diameter 8m is 10m high. 400 T of oil of density 0.900 at 15<sup>o</sup>C in vacuum is to be loaded in the tank at 28<sup>o</sup>C. Find the ullage at load port and ullage during the voyage – if its temperature rises to 38<sup>o</sup>C. (Given  $\pi = 3.1416$ ) (Use ASTM table).

**Q.2** A cargo hold of dimension (20m x 15m x 9.05m) was loaded with 50 machinery cases of dimensions (1.5m x 1.3m x 2m) with a Broken stowage of 20% and 200 T of cotton bales (SF 2.5m<sup>3</sup>/t + BS 10%). Prior loading a layer of dunnage 5 cm high on tank top and side battens extending 20 cm from ship side were arranged in the hold. Find weight and number of jute bales (SF 1.6m<sup>3</sup>/t + BS 0%) which can be loaded in remaining space – if each jute bale weighs 500 Kg.

**Q.3** a) State and describe the hazards involved in carriage of cargo on Gas Tankers.  
b) With respect to an oil tanker explain the purpose and working of Wet Deck Seal Unit.

**Q.4** Sketch and describe the Direct and Ring main system of Pipe lines of Oil tankers.

**Q.5** With respect to IMDG Code: Explain

- a) Segregation of IMDG Cargo.
- b) MFAG
- c) EMS

**Q.6** a) Explain the dangers associated with handling of concentrate in bulk.  
b) What precautions are to be taken when loading the concentrates?

**Q.7** State the recommendations for stowage, lashing and securing of Timber deck cargoes as set out in Code of Safe practice for ships carrying timber deck cargoes.

**Q.8** a) Explain the following on a Container vessel:

- i) Bay plan
  - ii) Stack weight
- b) Describe the operation of loading care on pure car carrier (PCC).

**Q.9** Describe the preparation and precautions to be taken for the carriage of Refrigerated cargo:

- a) Prior Loading
- b) During Loading
- c) During transit and discharging

**Q.10** What are the hazards associated with Sulphur? What are the precautions to be taken during the carriage?

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

**GOVERNMENT OF INDIA**

**PM PAPER**

**Date: - 10<sup>th</sup> Nov-2023**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1 a)** A gun tackle rigged to advantage is used to lift a load of 3 tonnes. Find out the effort and minimum size of polypropylene rope required. (10 Marks)

**b)** If the hauling part of this purchase was secured to the moving block of a Luff tackle used to disadvantage, find out the effort required, efficiency of the system and minimum size of nylon rope required for the watch tackle. (Assume friction 12% per sheave for both the purchases and use a factor of safety=6) (15 Marks)

**Q.2** An oil tanker with tank dimensions 28m x 20m x 9m is loading oil at 28 deg C. It is decided to leave 3% of the volume of the oil for expansion at all times. The ullage pipe is 1.2m above the top of the tank. If the maximum temperature of the oil during the voyage is expected to reach 38 deg C. Calculate the quantity of oil and final ullage at load port assuming that the vessel is at even keel on completion. Given that density of oil at 15 deg C = 0.8545 (use ASTM tables).

**Q.3** As per the Dock Labour Regulations answer the following:

- a) List the ship's cargo gear that must be inspected by a competent person. (10 Marks)
- b) Enumerate the duties and responsibilities of Dock Safety Inspector. (15 Marks)

**Q.4** Draw a block diagram of Inert Gas System fitted on a chemical tanker including both E/R and Deck area.

**Q.5** What are the different types of piping systems on an oil tanker? With a neat block diagram of any one type of piping system explain the salient features.

- a) Write notes on IMSBC Code, describing its objectives. (10 Marks)
- b) What are the dangers associated with carriage of solid bulk cargoes. (10 Marks)
- c) Define TML and FML. (05 Marks)

**Q.7** What are the factors to be considered prior loading Timber cargo on deck? Explain the lashing arrangements of timber deck cargo as per the Timber Code.

- a) List the information available on CSC plate with reference to a marine container. (10 Marks)
- b) Write short notes on: i) Bridge fittings    ii) Stacking cones    iii) Twist lock (15 Marks)

**Q.9** What are the hazards associated with the carriage of grain cargo.  
How will you prepare a cargo hold for loading grain?

- a) In a wire rope of 16mm diameter, construction of 6 x 24, 12 wires are broken along a length of 80 cm. Explain by calculations if you can use the wire or not. Give justifications to your answer. (15 Marks)
- b) Describe the precautions to be taken while loading a heavy lift. (10 Marks)

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

# GOVERNMENT OF INDIA

AM PAPER

Date: - 10<sup>th</sup> Nov-2023

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A GYN Tackle reeved to advantage & a luff tackle reeved to disadvantage are together used to lift a load of 8T. The weight is suspended from the GYN tackle whose hauling part is secured to the moving block of the luff tackle. Find minimum size of 6 x 37 wire to be used in GYN tackle & Nylon rope in Luff tackle. Take friction on each block as 13%. Calculate effort, size of wire & rope and efficiency of the system.

**Q.2** A boxed shaped tank of dimension 35 x 30 x 24 meters has to be loaded in such a way so that 3% of the volume of the tank will always be available for expansion. Temperature of oil at load port is 25°C. Maximum expected temp during the voyage is 34°C. Height of ullage port is 0.48 mtrs. Density of oil at 15°C in vacuum = 0.8650 t/cbm.

**Q.3** With respect to an Oil tanker explain:

- a) Ring main system                      b) Static accumulation                      c) Deck seal unit

**Q.4 a)** Explain role of Competent person under Dock safety regulations.

b) AS officer in charge of cargo watch, what are the checks you will perform on cargo gear prior to allowing in use?

**Q.5 a)** Explain in short, the following with diagram where necessary:

- i) Stack height                      ii) CSC plate                      iii) Check digit  
iv) Out of Gauge Containers                      v) Cell guides                      vi) Twin Stackers

b) Draw a Bay plan & show the following on plan:

- i) 100084                      ii) 090606

**Q.6** In IMDG explain:                      a) Shipper's declaration                      b) UN No.                      c) MFAG                      d) Documentation

**Q.7 a)** Cargo of Fertilizers is to be loaded onboard your vessel. The last cargo carried was iron ore. How will you prepare your hatches for loading fertilizers?

b) After completion of Fertilizers it is observed that the Air pipe is damaged by stevedore's loader/grab, make a 3<sup>rd</sup> party damage report?

**Q.8 a)** What are the precautions to be taken when opening bow doors of Ro Ro ships?

b) Explain how will you get your Reefer hold ready for loading apples?

**Q.9** Sketch and describe any two:

- a) Centrifugal Pump                      b) Eductor                      c) Bundling of Grain Cargo                      d) Explosimeter

**Q.10** What are various types of Corrosion and how is it taken care of on ships?

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

**GOVERNMENT OF INDIA**

Date: - 8<sup>th</sup> Sept-2023

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A boxed shaped tank of dimensions 35 x 30 x 24 m is loaded with oil cargo up to an ullage of 3.47 m at 24°C. Density of oil at 15°C. Density of oil at 15°C in vacuum is 0.8450 t/m<sup>3</sup> and location of ullage port above deck is 0.45m. Find up to what temperature this oil can be heated so that ullage in the tank will not fall below 3.34m. (Use ASTM tables).

**Q.2** A ship of 3520 T deadweight has onboard 420T of stores and bunkers and 70T of water. Stow Timber (S.F. 1m<sup>3</sup>/T) and Rolls of paper (S.F. 3.4m<sup>3</sup>/T) to fill the ship. The hold capacities are No. 1 – 1550 M<sup>3</sup>, No. 2 – 1585 M<sup>3</sup>, No. 3-1250 M<sup>3</sup> and No.4 – 1015M<sup>3</sup> respectively. State the distribution of each cargo in each of the space.

**Q.3** A Crude oil tanker, after completing her discharging at a port, is on her ballast voyage. One of the valve in a tank is leaking and requires which necessitates tank entry. Explain the procedure to prepare the tank for man entry. After the completion of repair, explain how you would make the tank ready for loading.

**Q.4** Describe the following with respect to a LPG tanker.

- a) Hazards and their control measures.
- b) Personal Protection requirements with regards to IGC Code?

**Q.5** With reference to the IMDG code, how will you identify the hazards associated with packaged goods? State the precautions you will take during your cargo watch when loading IMDG cargo?

**Q.6** a) Explain the following with diagram where necessary:

- i) Stack height
  - ii) CSC plate
  - iii) Check digit
  - iv) Cell guides
- b) Draw a Bay plan & show the following
- i) 100084
  - ii) 090606

**Q.7** a) Cargo of Fertilizers in bulk is to be loaded onboard your vessel. The last cargo carried was iron ore. How will you prepare your hatches for loading fertilizers?

b) After completion of discharge it is observed that the Air pipe is damaged by stevedore's loader / grab. Make a 3<sup>rd</sup> party damage report?

**Q.8** a) What are the precautions to be taken when operating Bow doors of Ro-Ro ships?

b) Explain how will you get your Reefer hold ready for loading edible cargo?

**Q.9** Sketch and describe any two:

- a) Centrifugal Pump
- b) Eductor
- c) Bundling of Grain Cargo
- d) Explosimeter

**Q.10** What are various types of Corrosion and how is it taken care of on ships?

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**GOVERNMENT OF INDIA**

Date: - 7<sup>th</sup> July-2023

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
  2. All Questions carry equal marks (i.e. 25 Marks each).
- 

**Q.1** A tank measuring 30m x 20m x 20m is to be loaded at 30°C with oil of density 0.85 at 15°C (in vacuum). If the maximum temperature expected during the voyage is 40°C and 2% of the tank on completion of loading and amount of cargo loaded, if top of the ullage pipe extends 0.6m above the tank top. (use ASTM tables).

**Q.2** A derrick fitted with 3-fold purchase used to advantages is to lift a load of 22T. The cargo Runner wire is rove through the lead block on derrick head and heel on the way to the winch. What will be the size of wire (6 x 12) to be used when Factor of Safety is 6 and Friction is 10%. What will be the efficiency of the system?

**Q.3** Draw, label and describe the Inert gas system used on a crude oil tanker.

**Q.4** a) What are the hazards associated with the carriage of liquefied gas cargoes?  
b) Explain the precautions to be taken in gas tankers with respect to IGC code?

**Q.5** a) What precautions have to be observed while loading / discharging explosives in Packaged form?  
b) With respect to the IMDG code, explain the following with sketches as applicable:  
i) Separated From                      ii) Separated by a Complete Compartment or Hold from

**Q.6** What precautions must be taken before loading and during transit for a cargo of Bulk Coal for which shipper has declared that same is liable to spontaneous combustion.

**Q.7** a) Describe hazards of carriage of solid bulk cargo as per IMSB (Bulk code).  
b) Define Angle of repose.

**Q.8** a) Explain the procedure and precaution of operating BOW doors on RO-RO (Roll on – Roll of) ships.  
b) Explain the importance of maintaining watertight integrity of car decks and how is the same ensured.

**Q.9** a) What are the precautions to be taken for loading deck Cargo.  
b) Explain the effect of heavy lift.  
i) On stability                      ii) Sea worthiness of ship.

**Q.10** a) How would you make a damage report if you notice a new indentation on tank top while working cargo by shore stevedores?  
b) Write short notes on Cargo securing manual and its contents.

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**GOVERNMENT OF INDIA**

**Paper 1**

**Date: - 8<sup>th</sup> May-2023**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tank measuring 20m x 12m x 15m contains un-pumpable oil of 10 m<sup>3</sup> on Arrival. Crude oil of density 0.85 @ 15°C (in vacuum) is to be loaded 2% of the tank volume is to be left for expansion. Loading temperature is 30°C & maximum temperature expected during the voyage is 40°C. Find:

- a) Ullage of tank on completion of loading.
- b) Amount of cargo loaded.

**Q.2 a)** A gun tackle rigged to advantage is used to lift a load of 3 tonnes. Find out the effort and minimum size of polypropylene rope required.

**b)** If the hauling part of this purchase was secured to the moving block of a watch tackle used to disadvantage, find out the effort required, efficiency of the system and minimum size of nylon rope required for the watch tackle. (Assume friction as 12% per sheave for both the purchase and use a factor of safety = 6).

**Q.3 a)** List the advantages & disadvantages of Crude Oil Washing.

**b)** Sketch & Label 'Wet Type Deck Seal'.

**Q.4** Describe the procedure on board a LPG tanker from securing alongside wharf until discharging commences.

**Q.5** Write short notes on the following with respect to IMDG code:

- a) UN number
- b) Ems
- c) Subsidiary risk
- d) IMDG code supplement

**Q.6** What are the hazards associated with loading and carriage of fertilizers? What are the associated precautions?

**Q.7** Enumerate the information exchange required as per BLU code between the ship and the terminal on a handy sized bulk carrier upon arrival at load port.

**Q.8 a)** Describe with the help of diagram how containers are secured on deck.

**b)** Explain with neat diagram how the position of particular container is designed on a container ship.

**Q.9** What precautions will you observe before and during the loading of a refrigerated cargo? State the difference between 'Frozen' and 'Chilled' cargoes with examples.

**Q.10 a)** Before commencing General cargo loading what inspections are to be carried out by the Duty Officer?

**b)** What will you do when a heavy lift is lifted by the ship's crane above the deck & there is black out?

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**GOVERNMENT OF INDIA**

**Paper 2**

**Date: - 8<sup>th</sup> May-2023**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** You have No. 2 lower hold with bale capacity of 3000 CBM and no. 2 tween deck with bale capacity of 2000 CBM to load following cargoes for Singapore and Hong Kong in that order.

Cargoes for Singapore:

200 tonnes cloves in bags with SF 4 cubic meters per tonne

400 tonnes of machinery cases with SF 2 cubic per tonne

Cargoes for Hong Kong:

1000 tonnes of steel coils with SF 1.2 cubic meters per tonne

500 tonnes of tea in chests with SF 3 cubic meters per tonne

100 tonnes package of electronic goods, with SF 3.5 cubic meters per tonne

Make a stowage plan taking into consideration, the safety of the ship and cargo and smooth discharge at the subsequent ports.

**Q.2** A weight of 15t is being lifted by a three-fold purchase, rigged to advantage. What minimum size of 6 x 37 wire rope can be used for the purchase of friction per sheave is 8% of weight? Find the efficiency of the system. (Factor of safety = 6)

**Q.3** Using a block diagram briefly describe the Inert Gas System (IGS) on board oil tankers.

**Q.4 a)** Explain the different types of Liquefied Gas Carriers.

b) What special type of cargo tanks are found most suitable for LNG carriage? List the reasons for the same.

**Q.5 a)** How is packing and labelling of dangerous goods to be carried out as per IMDG Code?

b) List the classes of dangerous goods as per IMDG Code.

**Q.6** What are the hazards associated with coal? What are the precautions to be taken during its carriage?

**Q.7** Discuss in details about how the IMSBC code and BLU code assists the mariner.

**Q.8 a)** Draw five different types of slings used in cargo handling.

b) Explain the Bay-Row Tier method of identifying containers on a container vessel.

**Q.9 a)** Differentiate between ship's sweat and cargo sweat?

b) A ship is loading rice cargo in winter in U.K. & destination is Mombassa (Kenya). How the ventilation is to be carried out for this cargo while on passage.

**Q.10** Explain the purpose of 'enhance survey programme' CAS and CAP. How it helps in detecting and rectifying damages within cargo holds?

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GOVERNMENT OF INDIA

Paper 2

Date: - 10<sup>th</sup> Mar-2023

SECOND MATE OF A FOREIGN GOING SHIPS  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A rectangular oil tank barge of dimension is 25m long x 10m wide x 5m deep is loaded with diesel oil 900 MT of density 0.7932 at 15°C. The ullage pipe is 0.5m high above the deck. If the temperature of oil at load port is 37.5°C and at discharge port is 41.5°C, calculate using ASTM tables, the ullages from the ullage port at load port upon completion of loading and at discharge port prior discharging.

**Q.2** A vessel is to load a full capacity of wheat in bulk in #3 lower hold and bagged wheat in 50kg bags in # 3 tween deck. Prepare a stowage plan indicating the maximum loadable quantity of bulk wheat in lower hold and bagged wheat in tween deck with the number of bags. Given:

Compartment	Grain Capacity	Bale Capacity
# 3 Lower hold	3136.2 cu. M	2885.3 cu. M
# 3 Tween Deck	1854.9 cu. M	1706.5 cu. M

Bagged wheat – each of 50 kgs – SF 1.85. BS 8%. Wheat in bulk – SF 1.3.

**Q.3** Draw an outline and describe the Inert Gas System on an Oil Tanker.

**Q.4** List the hazards of chemical cargoes. Explain the procedure for preparing a cargo tank for main entry.

**Q.5** With reference to IMDG code, what is the purpose, content and use of MFAG and EmS?

- Q.6** a) Discuss the preparation of holds for the carriage of grain.  
b) Explain any one method of securing grain against shifting in a partly filled compartment.

**Q.7** Sketch and describe the securing and lashing arrangement of two tiers of containers on the hatch top of a container vessel.

**Q.8** Explain the procedure for operation and maintenance of bow doors of a Ro-Ro vessel.

**Q.9** How does heavy lift cargoes affect the stability of the ship. List the precautions of a heavy lift using ships gear when vessel is alongside.

- Q.10** a) Enumerate the checks to be carried out on lifting gear prior and during use. (10 Marks)  
b) List the information available in Chain Register. (15 Marks)

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**GOVERNMENT OF INDIA**

**Paper 1**

**Date: - 10<sup>th</sup> Mar-2023**

**SECOND MATE OF A FOREIGN GOING SHIPs  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A ship hold has a bale capacity of 680 cu m/t and a grain capacity of 735 cu.m and is filled with maize stowing at 1.27 cu m/t. It is now intended to discharge 175 tons of maize and load bagged maize in the same hold. The bags are 0.5m x 0.4m x 0.3m and weigh 50 kgs. The space lost between the bags is 12%. How many tons of bagged maize can be loaded.

**Q.2** A tank has an area of 75 m<sup>2</sup> and its present ullage is 1.6 m. The tank is being filled through a pipe of diameter 200 mm. Calculate for how much longer the tank valve should be left open to obtain an ullage of 800 mm. Average rate of flow through pipe is 1.75 m per second.

**Q.3** a) List the different types of Containers available. (Size wise, uses and Shape wise). (15 Marks)  
b) What are advantages and disadvantages of containerization over the traditional Break Bulk method of loading. (10 Marks)

**Q.4** W.r.t. Oil Tanker, write short notes on: a) PV valve      b) COW      c) Load on Top. (15 Marks)  
b) Draw Flammability Diagram for hydrocarbons. (10 Marks)

**Q.5** W.r.t. IMDG code, write short notes with sketches: a) Away from      b) Separated from  
c) Separated by a complete compartment      d) Separated longitudinally by an intervening complete compartment.

**Q.6** What are the precautions to be taken while loading and carriage of high-density cargo?

**Q.7** How will you secure a container on the hatch cover of a general cargo ship? Explain with neat sketches.

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

- a) Twist locks and bridge fittings for container securing.
- b) Stowage factor and Broken Stowage
- c) Measurement Cargo and DWT cargo

**Q.9** a) Explain the hazards involved in Gas Carriers while unloading and during carriage of the cargo. (15 Marks)

b) Write short notes on reliquefaction system on gas carriers. (10 Marks)

**Q.10** a) Write short notes on Dock Safety Regulations. (15 Marks)

b) As an Officer-in-charge of cargo watch, what are the check you will perform on cargo gear prior allowing its use? (10 Marks)

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**GOVERNMENT OF INDIA**

Date: - 10<sup>th</sup> Jan-2023

**SECOND MATE OF A FOREIGN GOING SHIPs  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A boxed-shaped tank of dimensions 35 x 30 x 24 mtrs is loaded with oil cargo up to an ullage of 3.47 mtrs at 24 deg c. Density of oil at 15 deg c in vacuum is 0.8450 t/cbm and location of ullage port above deck is 0.45 mtrs. Find up to what temperature this oil can be heated so that ullage in the tank will not fall below 3.34 mtrs. (Use ASTM Tables).

**Q.2** A ship of 3520 t deadweight has on board 420 T of stores and bunkers and 70 T of water. Stow Timber (S.F.1 m<sup>3</sup>/T) and Rolls of paper (S.F. 3.4 m<sup>3</sup>/T) to fill the ship. The hold capacities are: No. 1 – 1550 m<sup>3</sup>, No. 2 – 1585 m<sup>3</sup>, No. 3 – 1250 m<sup>3</sup> and No. 4 – 1015 m<sup>3</sup> resp. State the distribution of each cargo in each of the space.

**Q.3** A Crude oil tanker, after completing her discharging at a port, is on her ballast voyage. One of the valve in a tank detected to be leaking requires maintenance and necessitates tank entry. Explain the procedure to  
a) prepare the tank for man entry (15 Marks)  
b) After the completion of repair, explain how would you prepare the tank for loading. (10 Marks)

**Q.4** Write short notes on:  
a) Category x cargo of fitness  
b) Type II Chemical tanker  
c) SMPEP manual  
d) Certificate  
e) Other substances as per Annex 2 of MARPOL.

**Q.5** With reference to the IMDG code, what all information are provided in part 3 of the code. What are the precautions you will take during your Cargo watch when loading dangerous cargo?

**Q.6** a) Explain the following with diagram where necessary:  
i) Stack height (15 Marks)  
ii) CSC plate  
iii) Out of Gauge Containers  
b) Draw a bay plan & explain the following:  
i) 100084 (10 Marks)  
ii) 090606  
iii) 090606

**Q.7** a) Cargo of fertilizers is to be loaded on Board your vessel. The last cargo carried was iron Ore. How will you prepare your hatches for loading fertilizers in bulk?  
b) After completion of discharge of fertilizers it is observed that the air pipe is damaged by stevedores, make a 3<sup>rd</sup> party damage report.

**Q.8** a) What are the precautions to be taken when operating Bow doors of Ro Ro ships? (15 Marks)  
b) Explain how will you get your reefer hold ready for loading on deck. (10 Marks)

**Q.9** a) How will you secure a heavy lift cargo loaded on deck.  
b) Write short notes on: i) Purpose and use of dunnage ii) Shoring iii) Side Battens

**Q.10** What are various types of Corrosion and how is it taken care of on ships?

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# GOVERNMENT OF INDIA

Date: - 9<sup>th</sup> Nov-2022

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Answer any 6 out of remaining 8 questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A triangular shaped tank has a base 8m x 8m x 10m and height of 12m. Oil of density 0.872 at 15°C (in vacuum) is to be loaded at 20°C. A minimum ullage of 0.2m is required at all times. If the maximum temperature expected during the voyage is 42°C, what should be the ullage at loading port? What is the ratio of empty space is filled space in the tank at the loading port? (Use ASTM table).

**Q.2** Using '6' as the 'factor of safety' a gyn tackle can safety lift a maximum load of 7 tonnes. What would be the maximum weight that can be lifted, if the same wire was used in gun tackle?

**Q.3** Sketch and describe the general arrangement of oil tanker showing typical location of cargo tanks, slop tanks, cofferdams and pump room.

**Q.4** a) What are the hazards associated with carriage of liquefied gas cargoes?  
b) Explain the precautions to be taken in gas tankers with respect to IGC Code?

**Q.5** a) Describe IMDG Dangerous Cargo Manifest.  
b) Explain Packing, Marking, Labelling and Placarding requirements of dangerous goods in packed form with respect to IMDG Code.

**Q.6** With respect to the carriage of grain in bulk, explain  
a) Document of Authorization                      b) Bundling  
c) How heeling moments are reduced when loading grain in bulk.

**Q.7** As per IMO code of Safe practices for ships carrying solid cargo in bulk. Describe the precautions to be observed when loading:  
a) High Density Cargoes                              b) Concentrates

**Q.8** a) How will you prepare the car decks for the loading of trailers and vehicles?  
b) Describe the various lashing materials used in securing containers on a container vessel.

**Q.9** State the provisions of the Dock Safety Regulation with respect to:  
a) Access to the ship                                      b) Initial testing of lifting gear  
c) Chain Register    d) Annual through Examination of lifting gear.

**Q.10** While making Stevedore's damage report on a vessel after discharging heavy lift, which items in the hold are to be checked?

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**GOVERNMENT OF INDIA**

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

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE  
PASS MARKS: 120**

**TIME: 3 Hours**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory. Answer any 6 out of remaining 8 questions.
2. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tank of length 32m x 18m x 11.5m contains water to a sounding of 10cms. Crude oil of density 0.8350 at 15 deg C in vacuum was loaded in tank at 25 deg C, also 3 percent volume of tank was left for expansion throughout the voyage. If maximum temperature during voyage is 34 deg Celsius.

- i) Find ullage at load port.
  - ii) The quantity of the cargo loaded.
- (Assume there is no change in the volume of water due to change of temp).

**Q.2** A gyn tackle rigged to disadvantage, is used to lift a weight of 6T, using a polypropylene rope. What will be the minimum diameter of the rope required to lift the weight. Assume friction is 10%. Safety Factor 6.

**Q.3** What is an Inert gas? Draw a schematic diagram with explanation of components of IG system on an oil tanker.

**Q.4 a)** Explain the aim and purpose of IGC Code and hazards associated with the carriage of Liquefied gases at sea. (15 Marks)

**b)** Describe types of gas tankers and different methods of liquefaction of gas on gas carriers. (10 Marks)

**Q.5** What is the aim of IMDG code? What are the classifications of dangerous goods as per the code?

**Q.6** What are the preparations of cargo hold & precautions to be taken while loading grain in bulk?

**Q.7** What is a Chain Register & what are the entries recorded in it?

**Q.8 a)** Sketch and describe securing and lashing arrangements of containers. (15 Marks)

**b)** Explain the information provided on the CSC plate of containers. (10 Marks)

**Q.9** Write short notes on the following:

- (i) Angle of repose
- (ii) Objectives & aim of BLU code.
- (iii) Flow Moisture Point & Transportable Moisture Limit.
- (iv) Bundling of grain cargo.

**Q.10** What are the stability criteria for loading timber cargo? Explain how you will lash the timber cargo on deck as a duty officer.

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**GOVERNMENT OF INDIA**

Date: - 12<sup>th</sup> Sept-2022

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A ship's hold has a bale capacity of 500m<sup>3</sup> and a grain capacity of 570m<sup>3</sup> and is filled with maize stowing at 1.25m<sup>3</sup>/t. It is now intended to discharge 100 tonnes of maize and load bagged maize in the same hold. (B.S. of bagged maize is 11%). The bags are 0.5m x 0.4m x 0.3m and weigh 50 kgs. What is the weight of bagged maize that can be loaded? (Assume bale capacity to grain capacity ratio constant through the entire hold).

**Q.2** A weight of 13T is to be lifted using a 2-fold purchase rigged to disadvantages. The hauling part of this purchase is secured to the moving block of Gun tackle rigged to advantage. Calculate:

- a) Effort required to lift the load.
- b) Efficiency of the system.
- c) Size of Nylon rope required for the Gun tackle.

(Given-factor of safety: 6, Friction: 8% of weight per sheave, velocity ratio of system equals product of individual velocity ratios).

**Q.3** A crude oil tanker has completed discharge of cargo and is now proceeding to a layup berth for some hot work to be carried out in two of her cargo tanks. Describe all the procedures you will follow to prepare the tanks for man entry. On completion of work how will you prepare the tanks again for loading?

**Q.4** What information is provided on Material Safety Data sheet and also Explain various categories of cargoes on chemical tankers?

- Q.5** a) Describe shipper's responsibilities for shipping dangerous goods as per IMDG code.  
b) What are the general precautions to be taken while loading explosive on board?

- Q.6** a) What are the hazards associated with carriage of concentrates and how these are overcome on board a general cargo ship?  
b) What precautions are stated in the IMSBC code regarding loading of high-density cargoes in bulk?

**Q.7** Describe hazards of carriage of TIMBER deck cargoes. Why those hazards are not present if same cargo is loaded inside the ship's hold?

- Q.8** a) What factors must be borne in mind for making a BAY PLAN of a container ship?  
b) Write short notes on TARE weight & purpose of check digit of a container serial number.

**Q.9** How is the vessel prepared for loading refrigerated cargo?

- Q.10** a) What cargo gear inspection will you carry out for your cranes before commencing cargo work?  
b) Describe the system of inspection & reporting (damage to cargo spaces) after all the cargo in hold is discharged.

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GOVERNMENT OF INDIA

Date: - 11<sup>th</sup> July-2022

SECOND MATE OF A FOREIGN GOING SHIP
FUNCTION: CARGO OPERATION
PAPER: CARGO HANDLING AND STOWAGE
PASS MARKS: 120

TIME: 3 Hours

MAX. MARKS: 200

Notes:

- 1. Question 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

Q.1 A rectangular tank (20m x 15m x 10.6m) is loaded to ullage of 3.2m with oil of R.D. 0.8502 at 34°C. Find minimum & maximum percentage of filling during the voyage if the temperature changes between 20°C & 64°C. The ullage pipe extends 91 centimeters above the top of the tank. (Density correction factor 0.0009/°C).

Q.2 Prepare a stowage plan for loading in No. 2 cargo hold based on the details given below: No. 2 LH capacity 1700 m³ and No. 2 Tween Deck capacity 1410 m³ are to be loaded and then discharged at Singapore and Honkong in that order. The area of LH and Tween Deck is 15 x 10m. The load density of LH is 8t/m² and TDK is 5t/m².

Following cargoes to be loaded:

Table with 4 columns: CARGO, S.F., WEIGHT (t), DISCHARGE PORT. Rows include Ore, Gunnies, Rubber, Tea Chest, Machinery, and Gunnies.

In addition to above cargoes, find the maximum amount of optional cargo which can be loaded and its SF so that holds are full to their capacities.

Q.3 Enumerate items which duty officers should attend to before during and after completion of loading operation.

Q.4 a) Explain various methods to control vapor space pressure in gas tanker tanks.
b) Explain briefly NLS Category X and Category Y cargoes as per MARPOL Annex II.

Q.5 In IMDG Code, explain briefly the following:

- a) Marking, Labelling & Placards
b) UN No.
c) MFAg

Q.6 Briefly describe the guidelines given in the IMSBC code regarding loading of bulk cargoes.

Q.7 What factors should be considered prior to loading Deck cargo? Describe with suitable sketch the lashings required for timber deck cargo.

Q.8 Write short notes on:

- a) Stowage factor and broken stowage
b) Cargo manifest
c) Types, sizes and marking of containers

Q.9 Give detailed description on hold preparation for carriage of bagged rice cargo. Describe the precautions you will observe during and after loading.

Q.10 What is the importance of a chain register? What all information should be available for testing and examination of cargo gears, derricks or cranes?

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**GOVERNMENT OF INDIA**

Date: - 11<sup>th</sup> May-2022

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE  
PASS MARKS: 120**

**TIME: 3 Hours**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A GYN tackle, the hauling part of which passes through a lead block, rigged to disadvantages is used to lift 8 MT, Find:-

- a) Effort
  - b) Efficiency of system and
  - c) Minimum size of wire rope to be used
- Friction: 10%, safety factor 6

**Q.2** On departure, the ullage of a box shaped bunker tank (L: 26.4m, B: 11.47 m & D: 9.13m) was 2.544m (temperature 44.3°C), ullage pipe rises 107 cms above the top of the tank. Enroute she transferred 108 cubic meters of the same oil at 26°C from her storage tank into this tank. Enroute the transferred 108 cubic meters of the same oil at 26°C from her storage tank into this tank. Find her daily consumption if she arrived with 108 mt of oil remaining after sailing for 949 hours. The density of oil is 0.8313 ts/cu m at 15°C in vacuum. ASTM tables can be made use of.

**Q.3** Describe briefly below:

- a) Precautions during COW
- b) Zero calibration and span adjustment of explosimeter
- c) PV Valve and PV breaker

**Q.4** Explain the hazards associated with the carriage of chemical and gas cargoes in tankers.

**Q.5** In the IMDG code what is the purpose of segregation Table? List and describe the various segregation terms used in the IMDG code.

**Q.6** Your v/l has just received orders to load as project cargo consisting of heavy duty vehicles on deck. Describe the hazards associated while loading and the precautions you will observe as an officer of watch on board the vessel during the loading operations.

**Q.7** As per BLU Code explain the principal and procedures between the Ship & Terminal prior to cargo handling.

**Q.8** a) With the help of a sketch explain the principle of Bay Row Tier co-ordinates on board a container vessel in helping to identify the location of containers.

b) Sketch and label the various lashing material used in securing containers.

**Q.9** Describe the arrangements made to maintain the watertight integrity on board Ro-Ro vessel as regards bow, stern and side doors. Also explain briefly the care and maintenance required for the same.

**Q.10** Explain the need for Enhanced Survey Programme (ESP) and also detail the procedure, planning, documentation and reporting of ESP.

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**GOVERNMENT OF INDIA**

Date: - 9<sup>th</sup> March-2022

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A Tween deck of dimensions 9m x 6m x 4m has a permissible load density of 3.10t/m<sup>2</sup>. Steel pipes (S.F. 1.05m<sup>3</sup>/t) and lub, Oil drum (S.F. 1.85m<sup>3</sup>/t) are to be loaded in the tween deck to fill all available space. Find maximum quantity of steel pipes and drums that can be loaded without exceeding load density?

**Q.2** A derrick fitted with 2-fold purchase used to advantages is to lift a load of 26T. The cargo runner wire is rove through the lead blocks on derrick head and heel on the way to the winch. What will be the size of wire (6 x 24) to be used when Factor of Safety is 6 and Friction is 8%. What will be the efficiency of the system?

**Q.3** Draw label and describe the Inert Gas system used on a crude oil tanker.

**Q.4** What are the hazards associated with sea transport of LPG / LNG cargoes in fully refrigerated gas tankers.

**Q.5** A container loaded 'on deck' containing IMDG cargo was found to be dripping some of its cargo. A deck hand, who went to clean the same, inhaled toxic fumes and collapsed. What actions are required to be taken on board with respect to safety, health and pollution prevention?

**Q.6** a) What are the hazards associated with carriage of concentrates and how these are overcome on board a general cargo ship?

b) What precautions are stated in the IMSBC code regarding loading of high – density cargoes in bulk?

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

a) Cargo securing manual and

b) effect of heavy deck cargo on stability of a ship

**Q.8** Describe the various types of containers based on size, material of construction and usage.

**Q.9** Describe with the aid of neat labeled sketches, securing of a locomotive on a multipurpose ship as per 'Code of safe practice for cargo stowage and securing'.

**Q.10** Write notes on Chain Register. Describing the following: Competent person, Competent Authority, Responsible person & entries are to be made in Part 1, Part 2, Part 3 of the chain register.

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**GOVERNMENT OF INDIA**

Date: - 8<sup>th</sup> February-2022

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A triangular shaped tank has a base 8m X 8m X 10m and height of 12m. Oil of density 0.872 at 15<sup>o</sup>C (in vacuum) is to be loaded at 20<sup>o</sup>C. A minimum ullage of 0.2m is required at all times. If the maximum temperature expected during the voyage is 42<sup>o</sup>C, what should be the ullage at loading port. What is the ratio of empty space to filled space in the tank at the loading port? (Use ASTM table).

**Q.2 a)** In a wire rope, 6 x 36, diameter 20mm, 22 individual wires were found broken in a length of 120mm. Will you accept or reject this wire rope? Show calculations and give reasons for your answer. (Marks 10)

b) Using GYN tackle, what size of wire rope of 6 x 24 should be used to lift a weight of 9 MT? (Marks 15)

**Q.3** Explain static charge on a tanker. What precautions can be taken on board to safeguard against it?

**Q.4** Explain the following: SLOP TANKS, COW, ROB, Load on Top.

**Q.5** With respects to IMDG code, Explain:

- i) Segregation "Away from"      ii) UN No.      iii) Stowage      iv) EmS      v) MFIAG

**Q.6 a)** Write short notes on DOA (Document of Authorization) as per Grain Code and the conditions which must be fulfilled to load bulk grain without DOA. (Marks 10)

b) Enumerate how a ship's hold will be prepared to load grain? (Marks 15)

**Q.7** As per Code of Safe Practice for Ships Carrying Timber Deck Cargo, what are the recommendations for Stowage, Lashing and securing of Timber Deck Cargo? Explain with suitable sketches.

**Q.8 a)** Describe how location of particular container is designated on a container ship by suitable sketches. (Marks 15)

b) Write short note on CSC plate of a container. (Marks 10)

**Q.9** What factors should be considered prior loading deck cargo? List the equipment used for securing cars on deck.

**Q.10 a)** Write contents and endorsements of the Chain Register. (Marks 15)

b) What is the purpose of Enhanced Survey and which ships are required to adopt this survey? (Marks 10)

**GOVERNMENT OF INDIA**

Date: - 12<sup>th</sup> January-2022

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** An oil tanker has a tank dimensions 28m x 20m x 9m is loading oil at 28°C. It is decided to leave 3% of the volume of the oil for expansion at all times. The ullage pipe is 1.2m above the top of the tank. If the maximum temperature of oil during the voyage is expected to reach 38°C. Calculate the quantity of oil and final ullage at load port assuming that the vessel is at even keel on completion. Given that density of oil at 15°C = 0.8545 (Use ASTM tables).

**Q.2** A hold 10 x 10 x 9m is to be loaded with steel plates (SF 2.05 m<sup>3</sup>/t) and steel coils (SF 1.86m<sup>3</sup>/t). If the load density of the tank top is 4.5t/m<sup>2</sup>. Calculate:  
a) How many tones of each cargo can be loaded?  
b) The height of both types of cargo.

**Q.3** Describe the construction and working principle with as neat sketch for the following:  
a) P/V Breaker (Marks 10)  
b) Wet type deck seal unit. (Marks 15)

**Q.4** Describe the precautions associated with the carriage of the liquefied gas cargo with regards to IGC code.

**Q.5** a) State the various associated with the carriage of the liquefied gas cargo with regards to IGC code.  
b) Describe the use of segregation tables as per IMDG. How are various classes of dangerous good segregated?

**Q.6** Write short notes on the following: (Marks 25)  
i) Strapping and Lashing                      ii) Bundling                      iii) Document of Authorizatou.

**Q.7** As per Code of Safe Practice for Ships Carrying Timber Deck Cargo, what are the recommendations for Stowage, Lashing and securing of Timber Deck Cargo? Explain with suitable sketches.

**Q.8** What precautions will you take prior loading, during loading & while carrying out Heavy lift cargo.

**Q.9** What factors should be considered prior loading deck cargo? List the equipment used for securing cars on deck.

**Q.10** What are the hazards associated with sulphur? What are the precautions to be taken during its carriage?

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**GOVERNMENT OF INDIA**

**Date: - 10<sup>th</sup> November-2021**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** An oil tanker has a tank dimensions 28m x 20m x 9m is loading oil at 28<sup>o</sup>C. It is decided to leave 3% of the volume of the oil for expansion at all times. The ullage pipe is 1.2m above the top of the tank. If the maximum temperature of oil during the voyage is expected to reach 38<sup>o</sup>C. Calculate the quantity of oil and final ullage at load port assuming that the vessel is at even keel on completion. Given that density of oil at 15<sup>o</sup>C = 0.8545 (use ASTM tables).

**Q.2** A hold 10 x 10 x 9m is to be loaded with steel plates (SF 2.05m<sup>3</sup>/t) and steel coils (SF 1.86 m<sup>3</sup>/t). If the load density of the tank top is 4.5t/m<sup>2</sup>. Calculate:

- a) How many tonnes of each cargo can be loaded?
- b) The height of both types of cargo.

**Q.3** Explain static charge on a tanker. What precautions can be taken on board to safeguard against it?

**Q.4** Explain various methods of venting of tanks on tankers. Sketch and give details of Pressure / vacuum valves.

**Q.5** With respect to IMDG code, Explain following:

- a) MFAG
- b) EmS
- c) UN no.

**Q.6 a)** Write short note on DOA (Document of Authorization) as per Grain Code and the conditions which must be fulfilled to load bulk grain without DOA. (Marks 10)

**b)** Enumerate how a ship's hold will be prepared to load grain? (Marks 15)

**Q.7** State the recommendations for stowage, lashing and securing of Timber deck cargoes as set out in Code of safe practices for ships carrying Timber deck cargoes.

**Q.8 a)** Sketch and describe securing and lashing arrangement of container. (Marks 15)

**b)** Describe the procedure for closing and securing of how does on a Ro-Ro vessel. (Marks 10)

**Q.9 a)** With the help of a sketch explain the principle of Bay Row Tier Co-ordinates on board a container vessel in helping to identify the location of containers. (Marks 10)

**b)** Sketch and label the various lashing material used in securing containers. (Marks 15)

**Q.10 a)** Write a short note on Dock Safety Regulations. (Marks 15)

**b)** List all checks you will do prior putting a cargo gear for use for lifting heavy lifts. (Marks 10)

**GOVERNMENT OF INDIA**

Date: - 8<sup>th</sup> October-2021

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tween deck is 15m long, 18 m wide and 4 m high and has a permissible load density of 5t/sq.m. Steel billets of SF 0.3 cu. m/t and general cargo of SF 4.0 cu. m/t are to be loaded therein to fill all available space. Find the maximum quantity of steel billets that can be loaded and the quantity of over stowed general cargo so that load density is not exceeded.

**Q.2** A derrick fitted with 2- fold purchase use to advantage is to lift a load of 26T. The cargo runner wire is rove through the lead blocks on derrick head and heel on the way to the winch. What will be the size of wire (6 x 24) to be used when Factor of Safety is 6 and Friction is 8%. What will be the efficiency off the system.

**Q.3** Sketch, label and describe the Inert Gas System used on a Crude Oil Tanker.

**Q.4 a)** What is ship sweat and cargo sweat? (Marks 10)

b) What precautions will you take to protect steel cargo from condensation damage at sea. (Marks 15)

**Q.5** With respect to IMDG code, Explain: (Marks 15)

i) Segregation "Away from" ii) UN No. iii) Stowage

iv) EmS v) MFAG

b) With respect to the carriage of dangerous cargo, explain: (Marks 10)

i) Segregation table ii) Marking iii) Labelling iv) Placarding

**Q.6 a)** What are the hazards associated with the carriage of Coal cargoes? (Marks 15)

b) What precautions are to be taken while carrying coal cargo? (Marks 10)

**Q.7** As per Code of Safe Practice for Ship's Carrying Timber Deck Cargo, what are the recommendations for Stowage, Lashing and securing of Timber Deck Cargo? Explain with suitable sketches.

**Q.8 a)** Describe the different types of slings used for cargo handling. (Marks 15)

b) Explain the information provided on the CSC plate of Containers. (Marks 10)

**Q.9 a)** What are Frozen, Chilled and Cold cargo? (Marks 15)

b) What precautions to be taken for preparing a compartment to receive Refrigerated cargo? (Marks 10)

**Q.10 a)** Write a short note on Dock Safety Regulations. (Marks 15)

b) List all checks you will do prior putting a cargo gear for use for lifting heavy lifts. (Marks 10)

**GOVERNMENT OF INDIA**

Date: - 8<sup>th</sup> September-2021

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**3. All questions carry equal marks (i.e. 25 marks each.)**

**Q.1** A box shaped tank barge measuring 23m x 19.6m x 14.6m (L x B x D) is loaded 84% at 19°C. 1,876.45 mt of the oil is delivered to a ship immediately. Find the minimum & the maximum ullage if this barge has to operate in a temperature range of 9°C & 47°C. The ullage port is located 1.27m above the top of the tank. Oil density is 865.7 kgs/m<sup>3</sup> in vacuum at 15°C.

**Q.2 a)** In a wire rope, 6 x 36, diameter 20 mm, 22 individual wires were found broken in a length of 120mm. will you accept or reject this wire rope? Show calculations and give reasons for your answer. (Marks 10)

**b)** Using GYN tackle, what size of wire rope of 6 x 24 should be used to lift a weight of 9 MT? (Marks 15)

**Q.3** Describe the construction and working principle with a neat sketch for the following:

a) P/V Breaker (Marks 10)

b) Wet type deck seal unit (Marks 15)

**Q.4 a)** Explain the following: SLOP TANKS, COW, ROB, Load on Top.

**Q.5** With respect to IMDG code, Explain:

i) Segregation "Away from"

ii) UN No.

iii) Stowage

iv) EmS

v) MFAG

**Q.6 a)** Write short notes on DOA (Document of Authorization) as per Grain Code and the conditions which must be fulfilled to load bulk grain without DOA. (Marks 10)

**b)** Enumerate how a ship's hold will be prepared to load grain? (Marks 15)

**Q.7** a) Describe in detail hazards of carriage of solid bulk cargoes as in IMSBC Code (International Maritime Solid Bulk Code). (Marks 15)

b) Explain Liquefaction and Transportable Moisture Limit. How should a can test may be done? (Marks 10)

**Q.8** a) Describe how location of a particular container is designated on a container ship by suitable sketches. (Marks 15)

b) Write short note on CSC plate of a container. (Marks 10)

**Q.9** a) Describe precautions to load heavy deck cargo with heavy lift. What action should be taken in case of blackout on ship during such work. (Marks 15)

b) Explain benefits of using dunnage materials for stowing various cargoes on deck or inside holds. (Marks 10)

**Q.10** a) Write contents and endorsements of the Chain Register. (Marks 15)

b) What is the purpose of Enhanced Survey and when ships are required to adopt this survey. (Marks 10)

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**GOVERNMENT OF INDIA**

Date: - 6<sup>th</sup> Aug-2021

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE  
PASS MARKS: 120**

**TIME: 3 Hours**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A triangular shaped tank has a base 8m x 8m x 10m and height of 12m. Oil of density 0.872 at 15°C (in vacuum) is to be loaded at 20°C. A minimum ullage of 0.2m is required at all times. If the maximum temperature expected during the voyage is 42°C, what should be the ullage at loading port. What is the ratio of empty space to filled space in the tank at the loading port? (Use ASTM table).

**Q.2** A hold 10 x 10 x 9m is to be loaded with steel plates (SF 2.05m<sup>3</sup>/t) and steel coils (SF 1.86m<sup>3</sup>/t). If the load density of the tank top is 4.5t/m<sup>2</sup>. Calculate:

- a) How many tonnes of each cargo can be loaded?
- b) The height of both types of cargo.

**Q.3** Explain the purpose, precautions, advantages and disadvantages of crude oil washing on a tanker ship.

**Q.4** Describe the precautions associated with the carriage of the liquefied gas cargo with regards to IGC code.

- Q.5** a) State the various classes of Dangerous goods as per IMDG code. (10 Marks)  
b) Describe the use of segregation tables as per IMDG. How are various classes of dangerous good segregated? (15 Marks)

**Q.6** Write short notes on the following:

- i) Strapping and Lashing                      ii) Bundling                      iii) Document of Authorization  
(25 Marks)

**Q.7** What are the stability criteria for loading timber cargo? Explain how you will lash the timber cargo on deck as a duty officer. (25 Marks)

**Q.8** What precautions will you take prior loading during loading & while carrying out Heavy Lift cargo. (25 Marks)

**Q.9** What is Bay Plan. How will you lash containers on deck. Explain with the Diagram.

**Q.10** What are the hazards associated with Sulphur? What are the precautions to be taken during its carriage.

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# GOVERNMENT OF INDIA

Date: - 15<sup>th</sup> July-2021

**SECOND MATE OF A FOREIGN GOING SHIP**  
**FUNCTION: CARGO OPERATION**  
**PAPER: CARGO HANDLING AND STOWAGE**  
**PASS MARKS: 120**

**TIME: 3 Hours**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A compartment 18m x 14m x 6m has a permissible load density of  $6t/m^2$ , steel billets of S.F.  $0.5m^3/t$ , B.S. 8% and general cargo of S.F.  $3.5m^3/t$ , B.S. 10%, are to be loaded there in to fill available space. Find the maximum quantity of steel billets that can be loaded and the quantity of over stowed general cargo so that no space is left unoccupied and load density is not exceeded.

**Q.2** A dimension of tank 35m x 21m x 16m, has to be loaded with crude oil at 25 deg Celsius. It is desired to leave 3% of the volume of oil loaded for expansion when maximum temperature is 44 deg Celsius. (Density of oil = 0.8475 @ 15 deg Celsius in Vacuum).

Calculate the following:

- a) Mass of the oil loaded.
- b) Ullage at load port.
- c) Ullage in the tank when temperature rises to 32 deg Celsius.

**Q.3** Sketch and describe flammable range diagram. Explain the rescue and procedure for inerting a Cargo Tank?

**Q.4** Describe the following with respect to LPG tanker.

- a) Hazards and their control measures. (Marks 20)
- b) Personal Protection requirements with regards to IGC Code? (Marks 10)

**Q.5** a) List the information available from the IMDG code? Explain how does this information help in the safe loading of dangerous goods? (Marks 15)

b) With respect to the IMDG code, explain the following with sketches as applicable:

- i) away from
- ii) separated from
- iii) Separated by a complete compartment or held. (Marks 10)

**Q.6** a) What are the hazards and associated precautions associated with solid bulk cargoes? (Marks 10)

b) Describe hazards associated with Transportation of Coal in Bulk. (Marks 15)

**Q.7** As per BLU Code (Code of practice for the safe Loading and unloading of Bulk carrier) prepare a ship / shore safety checklist for loading a dry bulk cargo carrier.

**Q.8** a) Sketch and describe a bay plan of a container ship. (10 Marks)

b) Describe the lashing and securing systems on container ships. (15 Marks)

**Q.9** What factors should be considered prior loading deck cargo? List the equipment used for securing cars on deck.

**Q.10 a)** List the contents of register of lifting appliances and cargo handling gear (Chain register). (10 Marks)

b) Explain the causes of corrosion in cargo and ballast tanks. (15 Marks)

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# GOVERNMENT OF INDIA

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

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE  
PASS MARKS: 120**

**TIME: 3 Hours**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tank measuring 21 m x 15 m x 16 m has an ullage port extending 1.0 m above the top of the tank. It is to be loaded with crude oil at 23 deg Celsius. 3% of the tank volume is to be left for expansion when maximum temperature expected during the voyage is 42 deg Celsius. (Density of oil = 0.81 @ 15 deg Celsius in Vacuum) (Use ASTM tables).

Find the:      a) Mass of oil loaded      b) Ullage at load port

**Q.2** A weight of 15 T is to be lifted using a 2 fold purchase rigged to disadvantage. The hauling part of this purchase is secured to the moving block of a Gun tackle rigged to advantage. Calculate:

- a) Effort required to lift the load.
- b) Efficiency of the System.
- c) Size of Polypropylene rope acquired for the Gun tackle.

(Given – Factor of Safety: 6, Friction: 10% of weight per sheave, Velocity Ratio of System equals product of individual Velocity Ratios).

**Q.3** a) Prepare a simple sketch of pipelines on an oil tanker.

b) What are the precaution for crude oil washing?

**Q.4** a) What are the hazards associated with carriage of chemical cargoes by sea? (10 marks)

b) Describe the various categories of chemical cargoes transported in bulk by sea. Give one example of each. (15 marks)

**Q.5** a) What precautions have to be observed while loading / discharging explosives in packaged form? (10 marks)

b) With respect to the IMDG code, explain the following with sketches as applicable:

i) Away from    ii) Separated From    iii) Separated by A Complete Compartment or Hold. (15 marks)

**Q.6** a) As per IMSBC Code, explain the associated hazards, precautions to be observed loading and transportation of high density cargoes. (15 marks)

b) Describe the hazards associated with carriage of grain in bulk. (10 marks)

**Q.7** As per Code of Safe Practice for Ships Carrying Timber Deck Cargo, what are the recommendations for stowage, lashing and securing of Timber deck cargo? Explain with suitable sketches.

**Q.8** a) With regards to container markings, describe: (10 marks)

i) Container Number      ii) CSC Safety Approval Plate

b) Sketch and describe following types of Containers: (15 marks)

i) General Purpose      ii) Tank

**Q.9** State the preparations and precautions to be observed for transporting a refrigerated cargo of on a reefer ship:

a) Preparation of holds      b) Inspection of the cargo      c) Purpose of temperature recording.

**Q.10** a) Write short notes on Dock Safety Regulations. (15 marks)

b) As officer in charge of cargo watch, what are the checks you will perform on cargo gear prior allowing it's use? (10 marks)

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**GOVERNMENT OF INDIA**

Date: - 2<sup>nd</sup> December-2020

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A box shaped tank of dimensions 20m x 16m x 16m is to be loaded with crude oil density 0.88 t/m<sup>3</sup> at 15°C in vacuum, Ullage of 1.5m has to be left for expansion, as maximum temperature was 41°C, expected during the voyage, the ullage pipe is extending 1.0m above the top of the tank. Find the mass of oil loaded and ullage of the tank if cargo temperature was 25°C at load port. (Use ASTM Tables).

**Q.2** A 3 fold purchase is used to advantage to lift a weight of 2 Tons. If 6 x 37 size wire rope is used, find the stress on the hauling part and also the minimum size of the rope (Assume friction to be 10% per sheave, Assume factor of safety as 5).

**Q.3** a) Explain the uses of following gas measuring instruments and how do they contribute towards safety of the ship and human lives on board a tanker:

- (i) Explosimeter      (ii) Tank Scope      (iii) Oxygen analyzer      (iv) Multi Gas Detector

b) Describe advantages and disadvantages of Crude Oil Washing.

**Q.4** Explain the hazards & precautions related to sea transport of Chemical Cargoes.

**Q.5** a) List the preparations of Cargo space and Precautions to be observed during loading of IMDG cargo.

b) Write short notes on the following:    i) MFAG      ii) EMS

**Q.6** a) On a ship carrying cargo of coal, what are the various assessments, observations and recordings carried out during carriage at sea. How are they done and what is their purpose?

b) Describe the hazards & precautions related to sea transport of concentrates.

**Q.7** a) Describe securing of locomotive on a multipurpose ship.

b) With regards to IMSBC Code define the following:-

- i) Angle of Repose    ii) flow moisture point      iii) Flow State      iv) Transportable moisture limit.

**Q.8** Explain all the factors in details which affect the stowage of containers onboard.

**Q.9** a) List the preparations of hold to be carried out prior loading Refrigerated cargo.

b) Explain the purpose of the following:

- i) Recording compartment temperatures.      ii) Brine traps

**Q.10** a) What safety checks you will perform on the cargo gears prior use?

b) Write short notes on Dock Safety Regulations.

**GOVERNMENT OF INDIA**

Date: - 10<sup>th</sup> November-2020

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tank with a constant surface area and 10 m depth has a volume of 9000m<sup>3</sup>. Oil of RD 0.87 at 20°C is to be loaded at 18°C. It is required to ensure that a minimum ullage of 0.22m is maintained during the voyage. If the maximum temperature during the voyage is expected to be 42°C and the correction factor for RD is 0.0006 per degrees Celsius, find a) the ullage on completion of loading at load port and b) the percentage volume of tank left at load port after loading for expansion.

**Q.2** a) In a wire rope (6 x 36, Dia 14mm) 10 wire strands were found broken in a length of 110mm. Will you reject or accept this wire?  
b) Using a threefold purchase, what is the smallest size of wire you would use to lift a weight of 10 tones?

**Q.3** Draw the diagram where appropriate and explain following:  
a) Flammability diagram  
b) Tank Scope  
c) Use of oxygen analyser.

**Q.4** What information is provided on Material Safety Data Sheet and also explains various categories of cargoes on chemical tankers?

**Q.5** What is IMDG code and what are the general precautions when carrying dangerous goods?

**Q.6** Explain securing arrangement for a partly filled compartment when carrying Grain in Bulk with diagram?

**Q.7** How does IMSBC code divide various groups of cargoes? What all things are required to be checked before accepting and loading a cargo?

**Q.8** a) What are torsional stresses and how can be compensated?  
b) Describe how the containers are loaded, secured and lashed.

**Q.9** What precautions would you take while loading explosives on a general cargo vessel.

**Q.10** How will you ensure that hatch covers are maintained weather tight/ water-tight?

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# GOVERNMENT OF INDIA

Date: - 5<sup>th</sup> October-2020

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tank of dimension 25 m x 18 m x 15 m is to be loaded with crude oil at 27 deg Celsius. It is desired to leave 2% of the volume of oil loaded for expansion when maximum temperature is 41 deg Celsius. (Density of oil = 0.825 @ 15 deg. Celsius in Vacuum). (Use ASTM Tables).

Calculate the following:

- a) Mass of oil loaded.
- b) Ullage at load port.
- c) Ullage in the tank when temperature rises to 38 deg Celsius.

**Q.2** A derrick fitted with 2-fold purchase used to advantage is to lift a load of 26 T. The cargo runner wire is rove through the lead blocks on derrick head and heel on the way to the winch. What will be the size of wire (6 x 24) to be used when Factor of Safety is 6 & Friction is 8%? What will be the efficiency of the system?

**Q.3** Write short notes on any two of the following (with sketches as applicable):

- a) Flammability Diagram
- b) PV Breaker
- c) Centrifugal Pumps

**Q.4** a) Explain the precautions to be taken in gas tankers with respect to IGC Code.

b) Define Category "Y" & Category "Z" NLS as per MARPOL Annex II.

**Q.5** With respect to IMDG code, explain the following:

- a) Dangerous Goods Manifest
- b) MFAG
- c) EmS

**Q.6** With respect to IMO Grain Regulations, explain the following with suitable sketches:

- a) Strapping / Lashing
- b) Bundling
- c) Saucering

**Q.7** As per IMSBC Code, explain the associated hazards, precautions to be observed while loading and transportation of the coal cargoes.

**Q.8** a) Sketch and describe the various types of lashing material used for securing containers? (10 Marks)

b) List the precautions to be taken for safe stowage and securing of vehicles on Ro-Ro ships. (15 Marks)

**Q.9** What precautions will you take prior loading, while loading and during carriage of heavy lift cargoes?

**Q.10** a) With reference to Dock Labor Regulations, describe the following: (15 marks)

i) Authorized Person                      ii) Competent Person                      iii) Responsible Person

b) Explain the need for periodical inspection and load testing of cargo gear. How frequently should such inspections and tests be conducted? (10 marks)

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**GOVERNMENT OF INDIA**

Date: - 6<sup>th</sup> March-2020

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** An oil tanker is loading at 35°C in a tank of dimensions L = 25m, B = 20m and D=18m. On completion of loading the ullage of cargo in tank was observed to be 1.85m, the ullage port is located on the centerline just fwd of the aft bulkhead, and is 1m above the tank top. Calculate the quantity of the cargo in the tank if the density of the oil at 15°C in vacuum was 0.7850t/m<sup>3</sup>.

**Q.2** Using '6' as the 'factor of safety' a gyn tackle can safely lift a load of 7 tonnes. What would be the maximum weight that can be lifted, if the same wire was used in a gun tackle?

**Q.3** With the help of sketches describe the direct line system of crude oil tanker give the advantages of the system over ring main system.

**Q.4** a) Describe the different types of gas carriers.  
b) State the various hazards associated with the gas cargoes and the precautions necessary.

**Q.5** a) Describe IMDG Dangerous Cargo Manifest.  
b) What are the general precautions to be taken while loading explosives on board?

**Q.6** Describe the preparations of hold for loading bulk grain. What are the hazards associated with such cargoes?

**Q.7** Write short notes on the following:  
a) TML as per IMSBC code.  
b) Cargo securing manual  
c) Hazards of carriage of timber cargoes.

**Q.8** a) Draw and explain the arrangements of container stowage using bay plan.  
b) Describe various lashing material used in securing containers on the container vessel.

**Q.9** What are the precautions will you take prior loading, during loading and while carrying heavy lift cargoes?

**Q.10** a) List the contents of chain register in detail?  
b) What will you do when a heavy lift is lifted by the ship's crane above the deck & there is black out?

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# GOVERNMENT OF INDIA

Date: - 10<sup>th</sup> January-2020

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

### Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A rectangular FO wing tank (15m long, 10m wide and 10m high) fitted with an ullage port extending 1m above deck and loaded with FO density at 15°C in vacuum 0.8650 t/m<sup>3</sup>. After loading ullage was found to be 2.2m at observed temperature 40°C. Find the maximum and minimum ullages during the voyage if the tank is first allowed to cool down to 30°C and then heated up to 50°C.

**Q.2** a) M.V. Hindship arrived in SW with the following drafts: F(P) 8.31m, F(S) 8.15m, M(P) 8.73m, M(S) 8.49m, A (P) 9.02m, A (S) 8.82m. Calculate her arrival displacement. **(5 Marks)**

b) Find the efficiency and size of Terylene rope to be used in a gyn tackle to advantage when used to lift a load of 2.5 mt, (friction 8% per sheave) what is the smallest purchase used to disadvantage that could be used to lift a 8 ton package received with a wire rope of SWL 2.80 tonnes.

**Q.3** a) Sketch and explain the flammability diagram. **(5 + 4 marks)**

b) Explain the functioning of following with necessary sketch (any 2): **(8x2 = 16 marks)**

- i) Deck seal
- ii) P/V valve
- iii) P/V breaker

**Q.4** Discuss the pre-wash, cleaning and disposal procedure (CDP) in context of the P & A Manual for noxious liquid substances.

**Q.5** With respect to IMDG Code, how will you find the hazards associated with packaged goods and the precautions you will take while on cargo watch during loading of that cargo?

**Q.6** a) Briefly describe the contents and use of the Cargo Securing Manual.

b) Enumerate the precautions required.

**Q.7** a) What is Timber Deck Cargo? **(5)**

b) What preparations are required prior loading timber deck cargo? **(10)**

c) What checks are required on loaded passage carrying timber deck cargo? **(10)**

**Q.8** With respect to containers explain followings:

- i) Marking on CSC Plate
- b) Stake weight
- c) Open top & Flat rack containers

**Q.9** What factors should be considered prior loading deck cargoes? List the equipment used for securing heavy trailers on deck and explain the securing with the help of a sketch.

**Q.10** a) Describe the care and maintenance of topping lifts, cargo runners and cargo blocks of cargo handling cranes.

b) Prepare an enclosed space entry checklist for entry into the fore peak tank for inspection.

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**GOVERNMENT OF INDIA**

**Date: - 8<sup>th</sup> Nov-2019**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** An oil tanker has a tank measuring length 35m, breadth 22m and depth 16m. It is loading crude oil at 30°C, leaving 2% of the volume of oil for expansion at all times. The ullage pipe is 1.2m above the tank top. If the Maximum temperature of oil during the voyage is expected to reach 38°C, calculate the quantity of oil loaded and the ullage at the load port. The density of oil is 0.8150 at 15°C in vacuum.

**Q.2** A two fold purchase is used to disadvantage to lift a load of 6 tons using nylon rope. Find the following:  
i) Effort      ii) Efficiency of the system      iii) Size of the rope. Friction is to be assumed at 12% per sheave and factor of safety – 6.

**Q.3** With suitable sketch describes the followings:  
a) Deck water sel of IG plant      b) Ring main cargo piping system.

**Q.4** a) Define four categories of NLS. What are the discharge criteria of category X cargo?  
b) What are the hazards associated with carriage of gas cargoes.

**Q.5** With reference to IMDG Code, explain following:  
i) Classification of dangerous goods      ii) Stowage and segregation      iii) EMS      iv) MFAG

**Q.6** i) What is 'Angle of Repose'? What is the importance of Angle of Repose?  
ii) Explain saucering for securing bulk grain cargoes filled in and trimmed compartment.

**Q.7** Differentiate between following:  
i) Cargo sweat and Ship sweat      ii) Stowage factor and Load density      iii) TML & FMP  
iv) SWL and Proof load.

**Q.8** With respect to containers explain followings:  
i) Marking on CSC Plate      b) Stake weight      c) Open top & Flat rack containers.

**Q.9** State the procedures for the preparations, stowage and carriage of refrigerated cargo.

**Q.10** Describe the procedure for entering a cargo tank in a VLCC after completing discharge of crude oil.

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# GOVERNMENT OF INDIA

Date: - 12<sup>h</sup> July-2019

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tank measuring 21 m X 15 m X 16 m has an ullage port extending 1.0 m above the top of the tank. It is to be loaded with crude oil at 23 deg Celsius. 3% of the tank volume is to be left for expansion when maximum temperature expected during the voyage is 42 deg Celsius. (Density of oil = 0.81 @ 15 deg Celsius in Vacuum). (Use ASTM tables)

Find the:

- a) Mass of oil loaded.
- b) Ullage at load port.

**Q.2** A derrick fitted with 2-fold purchase used to advantage is to lift a load of 26 T. The cargo runner wire is rove through the lead blocks on derrick head and heel on the way to the winch. What will be the size of wire (6 X 24) to be used when Factor of Safety is 6 and Friction is 8%. What will be the efficiency of the system?

**Q.3** Sketch, label and describe the Inert Gas System used on a Crude Oil Tanker.

**Q.4** a) What are the hazards associated with carriage of liquefied gas cargoes by sea?  
b) Describe the various categories of chemical cargoes transported in bulk by sea. Give two examples of each.

**Q.5** a) What precautions have to be observed while loading / discharging explosives in packaged form? (10 marks)

b) With respect to the IMDG code, explain the following with sketches as applicable:  
i) Away From    ii) Separated from    iii) Separated by A Complete Compartment or Hold. (15 marks)

**Q.6** As per IMSBC Code, explain the associated hazards, precautions to be observed while loading and transportation of coal cargoes.

**Q.7** As per Code of Safe Practice for Ships Carrying Timber Deck Cargo, what are the recommendations for stowage, lashing and securing of Timber deck cargo? Explain with suitable sketches.

**Q.8** a) With regards to container markings, describe: (10 marks)  
(i) Container Number                      (ii) CSC Safety Approval Plate

b) Sketch and describe the following types of containers: (15 marks)  
(i) General Purpose                      (ii) Tank

**Q.9** What precautions will you take prior loading, while loading and during carriage off heavy lift cargoes?

**Q.10** a) With reference to Dock Labor Regulations, describe the following: (15 marks)  
i) Authorized Person                      ii) Competent Person                      iii) Responsible Person

b) Explain the need for periodical inspection and load testing of cargo gear. How frequently should such inspections and tests be conducted? (10 marks)

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**GOVERNMENT OF INDIA**

**Date: - 09<sup>th</sup> May-2019**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO OPERATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A two fold purchase, rigged to disadvantage, is loaded with 8T, the hauling part of which is connected to a GUN tackle, rigged to advantage. Find:-

- a. Effort
- b. Efficiency of the system
- c. Minimum size of wire rope for two fold purchase and size of nylon rope for gun tackle Friction 10%, safety factor 6.

**Q.2** Using '6' as the 'factor of safety' a Gyn tackle can safely lift a maximum load of 7 tonnes. What would be the maximum weight that can be lifted, if the same wire was used in a gun tackle?

**Q.3** Draw a block diagram of IGS and explain its components.

- a. Draw and describe independent Type A tank of a gas tanker.
- b. As duty officer what hazards are you likely to experience during loading of NLS on chemical tankers.

- a. Enumerate powers of dock safety inspector as per Dock Labor Regulations.
- b. Write short notes on Mates Receipt & Bill of Lading.

- a. Write the contents of IMDG Code Supplement, describing in detail the EMS and MFAG.
- b. State the dangers of loading iron ore in bulk and what precautions need to be taken while loading heavy bulk cargo as enumerated in IMSBC (Solid Bulk Code).

- a. Write notes on D.O.A. (Document of authorization) of Grain Code.
- b. Define Angle of Repose, and how it affects bulk grain? Draw and briefly describe one method of securing free grain surface in a partly filled hold.

- a. Describe main hazard on a RO – RO vessel and give reasons for same.
- b. Write short notes on CSC plate of a container, and the information it shows.

- a. Describe in detail how will hold preparation for reefer ships be carried out?
- b. What are the main hazards of TIMBER deck cargoes?

- a. What purpose does ENHANCE survey serve and which type of vessels are subject to it.
- b. Explain the importance of hold inspection after a cargo is discharged to find if any damage is done by stevedores.

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# GOVERNMENT OF INDIA

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

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO OPERATION PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any Six out of Eight Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A tank of length 32m x 18m x 115m contains water to a sounding of 10 cms. Crude oil of density 0.8350 at 15°C in vacuum was loaded in the tank at 25°C and 3% of the volume of oil loaded was left empty for expansion throughout the voyage. If maximum temperature during the voyage is 34°C, find (i) the ullage at load port; (ii) the quantity of the cargo loaded.

**Q.2** A load of 5 tons is to be lifted by a gyn tackle rigged to advantage. The hauling part of this purchase rigged to the moving block of a gun tackle used to disadvantage using nylon rope. Calculate the size of nylon rope which has to be used for the gun tackle and the efficiency of the system. Friction is to be assumed at 12% per sheave and factor of safety = 6.

**Q.3** Describe, with sketch, pipeline arrangement in Crude oil carrier.

**Q.4** What is the importance of Cargo Securing Manual? Write its contents. With reference to it, explain the procedure for safe stowage and securing of heavy lifts on deck.

**Q.5** What are the objectives of IMDG Code? With reference to IMDG Code explain: (i) Segregation table: (ii) labelling; (iii) Marking, (iv) Placarding.

**Q.6** (i) What is 'Angle of Repose'? What is the importance of Angle of Repose?  
(ii) Next cargo to load on board is wheat in bulk. Explain the preparation of holds and hazards involved.

**Q.7** Describe the correct stowage, lashings and securing of the deck cargo of a timber carrier as per Code of Safe Practice for Ships carrying Timber deck cargoes.

**Q.8** What is 'Bay plan' on a container ship? Explain with suitable sketch the securing of containers on deck and in the hold. What markings are to be displayed on CSC plate?

**Q.9** Explain the difference between "Frozen" & "Chilled" cargo giving some examples. What precautions will you observe before and during loading of refrigerated cargoes and also state the care taken during the voyage?

**Q.10** As a duty officer explain the importance of checking cargo hold after completion of discharge. What actions will you take if any damage is noticed?

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# GOVERNMENT OF INDIA

Date: - 08<sup>th</sup> Jan-2019

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any 6 out of 8 Questions.
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A ship with maximum displacement 15700mt is arriving at load port with 125mt of bunkers and 25mt of fresh water. Light ship weight is 3980mt. She has to receive 1300mt bunkers and 250mt of fresh water. Light ship weight is 3980mt. She has 5 holds each 20 x 14 x 10m and load density 7.5t/m<sup>2</sup>. She has to load iron ore cargo with SF 0.6m<sup>3</sup>/t. Find maximum quantity of cargo that can be loaded.

**Q.2** A weight of 10T is to be lifted using a two fold purchase rigged to disadvantage. The hauling part of this purchase is secured to the moving block of a gun tackle rigged to advantage.

Calculate:

- a) Effort required to lift the load.
- b) Efficiency of the system.
- c) Size of Nylon rope required for the 2 fold purchase.

(Given : Factor of safety – 6, Friction – 10% of weight per sheave, Velocity Ratio of System equals product of individual velocity ratios)

**Q.3** Why is inerting carried out on oil tankers? Describe the inert gas system with diagram on an oil tanker.

**Q.4** What are the hazards associated with NLS? Describe the precautions to be observed during cargo operations of NLS substance in port?

**Q.5** a) State the various classes of Dangerous goods as per IMDG code.

b) Describe the use of segregation tables as per IMDG. How are various classes of dangerous good segregated?

**Q.6** What precautions will you take for loading heavy density cargo in Bulk as a duty officer?

**Q.7** What are the stability criteria for loading timber cargo? Explain how you will lash the timber cargo on deck as a duty officer.

**Q.8** What is bay plan, how will you lash the containers on deck? Explain with diagram.

**Q.9** Briefly explain how will you go about planning the stow of a heavy lift cargo.

**Q.10** What are the main causes of corrosion in cargo and ballast spaces? How will you identify and prevent reduce corrosion.

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# GOVERNMENT OF INDIA

Date: - 08<sup>th</sup> Nov-2018

## SECOND MATE OF A FOREIGN GOING SHIP FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Question 1 & 2 are compulsory
2. Attempt any 6 out of 8 Questions
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** An oil tanker has a tank dimensions 28m x 20m x 9m is loading oil at 28°C. It is decided to leave 3% of the volume of the oil for expansion at all times. The ullage pipe is 1.2m above the top of the tank. If the maximum temperature of oil during the voyage is expected to reach 38°C. Calculate the quantity of oil and final ullage at load port assuming that the vessel is at even keel on completion. Given that density of oil at 15°C = 0.8545 (use ASTM tables).

**Q.2** A weight of 13T is to be lifted using a 2 fold purchase rigged to disadvantage. The hauling part of this purchase is secured to the moving block of a Gun tackle rigged to advantage. Calculate:

- a) Effort required to lift the load
- b) Efficiency of the system
- c) Size of Nylon rope required for the Gun tackle.

**Q.3** Why is inerting carried out on oil tankers? Describe the full procedure of inert gas system with diagram on an oil tanker.

**Q.4** What are the hazards associated with NLS substances? Describe the precautions to be observed during cargo operations of NLS substance in port?

**Q.5** With respect to IMDG Cargo briefly explain:

- a) Stowage
- b) Segregation "Away from"
- c) UN Number
- d) MFAG
- e) EMS

**Q.6** What are the hazards associated with grain cargo. With respect to Grain Code, explain with neat sketch, any one method of ensuring that the effect of grain shifting inside a partly loaded compartment cannot endanger the vessel.

**Q.7** What are the hazards associated with timber deck cargo? State the required preparations before commencing to load timber on deck and on hatch coming.

**Q.8** a) What are the advantages and disadvantages of containerization?

- b) Describe the various lashing materials used in securing containers on a container vessel.

**Q.9** What preparations will you make prior to loading refrigerated cargo? What are the procedure to be followed for maintaining the temperature?

**Q.10** a) Write short notes on inspection and detection of defects in cargos spaces.

- b) How will you check the weather tightness of hatch cover?

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SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL  
PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Question 1 & 2 are compulsory
2. Attempt any 6 out of 8 Questions
3. All Questions carry equal marks (i.e. 25 Marks each).

**Q.1** A rectangular tank (20m x 15 m x 10.6m) is loaded to ullage of 3.2m with oil of R.D. 0.8502 at 34°C. Find Minimum & Maximum percentage of filling during the voyage if the temperature changes between 20°C & 64°C. The ullage pipe extends 91 centimeters above the top of the tank (Density correction factor 0.0009/°C).

**Q.2** Prepare a stowage plan for loading in No. 2 cargo hold based on the details given below: No. 2 LH capacity 1700m<sup>3</sup> and No. 2 Tween Deck capacity 1410m<sup>0</sup> are to be loaded and then discharged at Singapore and Hong-Kong in that order. The area of LH and Tween deck is 15 x 10m. The load density of LH is 8t/m<sup>2</sup> and TDK is 5t/m<sup>2</sup>.

Following cargoes to be loaded:

CARGO	S.F.	WEIGHT (t)	DISCHARGE PORT
Ore	0.5	400	Hong Kong
Gunnies	1.7	500	Hong Kong
Rubber	2.0	100	Hong Kong
Tea Chest	3.0	80	Singapore
Machinery	2.0	70	Singapore
Gunnies	1.7	400	Singapore

In addition to above cargoes, find the maximum amount of optional cargo which can be loaded and its SF so that holds are full to their capacities.

- Q.3** a) List the advantages & disadvantages of Crude Oil Washing.  
b) Sketch & label "Wet Type Deck Seal".

**Q.4** Describe the procedure on board a LPG tanker from securing alongside wharf until discharging commences.

**Q.5** Write short notes on the following with respect to IMDG code:

- a) UN number                      b) EMS                      c) Subsidiary risk                      d) IMDG code supplement.

**Q.6** Briefly describe the guidelines given in the IMSBC code regarding loading of bulk cargoes.

**Q.7** What factors should be considered prior to loading Deck cargo? Describe with suitable sketch the lashings required for timber deck cargo.

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

- a) Stowage factor and broken stowage.
- b) Cargo manifest
- c) Types, sizes and markings of containers.

**Q.9** Give detailed description on hold preparation for carriage of bagged rice cargo. Describe the precautions you will observe during and after loading.

**Q.10** What is the importance of a chain register? What all information should be available for testing and examination of cargo gears, derricks or cranes?

**GOVERNMENT OF INDIA**

**Date: - 6<sup>th</sup> July-2018**

**SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: NAVIGATION  
PAPER: CARGO HANDLING AND STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question 1 & 2 are compulsory
2. Attempt any six out of Eight Questions
3. All Questions carry equal marks i.e. 25 Marks each.

**Q.1** A tank measuring 20m X 12m X 15m contains un-pumpable oil of 10m<sup>3</sup> on arrival. Crude oil density 0.85 @ 15°C (in vacuum) is to be loaded. 2% of the tank volume is to be left for expansion. Loading temperature is 30°C & maximum temperature expected during the voyage is 40°C, Find:

- a) Ullage of tank on completion of loading.
- b) Amount of cargo loaded.

**Q.2 a)** A gun tackle rigged to advantage is used to lift a load of 3 tonnes. Find out the effort and minimum size of polypropylene rope required.

b) If the hauling part of this purchase was secured to the moving block of a watch tackle used to disadvantage, find out the effort required, efficiency of the system and minimum size of nylon rope required for the watch tackle. (Assume friction as 12% per sheave for both the purchases and use a factor of safety =6)

**Q.3** Sketch and describe the general arrangement of oil tanker showing typical location of cargo tanks, slop tanks, cofferdams and pump room.

**Q.4 a)** What are the hazards associated with carriage of liquefied gas cargoes?

b) Explain the precautions to be taken in gas tankers with respect to IGC Code?

**Q.5 a)** Describe IMDG Dangerous Cargo Manifest.

b) Explain Packing, Marking, Labelling and Placarding requirements of dangerous goods in packed form with respect to IMDG Code.

**Q.6** What are the hazards associated with loading and carriage of fertilizers? What are the associated precautions?

**Q.7** Enumerate the information exchange required as per BLU code between the ship and the terminal on a handy sized bulk carrier upon arrival at load port.

**Q.8 a)** Describe with the help of diagram how containers are secured on deck.

b) Explain with neat diagram how the position of particular container is designed on a container ship.

**Q.9** What precautions will you observe before and during the loading of a refrigerated cargo? State the difference between 'Frozen' and 'Chilled' cargoes with examples.

**Q.10 a)** Before commencing general cargo loading what inspections are to be carried out by the Duty Officer?

b) What will you do when a heavy lift is lifted by the ship's crane above the deck & there is black out?

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SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: NAVIGATION  
PAPER: CARGO HANDLING AND STOWAGE  
PASS MARKS: 120

TIME: 3 Hours

MAX. MARKS: 200

Notes:

1. Question 1 & 2 are compulsory
2. Attempt any six out of Eight Questions
3. All Questions carry equal marks i.e. 25 Marks each.

**Q.1** You have No. 2 lower hold with bale capacity of 3000 CBM and no. 2 tween deck with bale capacity of 2000 CBM to load following cargoes for Singapore and Hong Kong in that order.

Cargoes for Singapore:

200 tonnes cloves in bags with SF 4 cubic meters per tonne  
400 tonnes of machinery cases with SF 2 cubic per tonne

Cargoes for Hong Kong:

1000 tonnes of steel coils with SF 1.2 cubic meters per tonne  
500 tonnes of tea in chests with SF 3 cubic meters per tonne  
100 tonnes package of electronic goods, with SF 3.5 cubic meters per tonne

Make a stowage plan taking into consideration, the safety of the ship and cargo and smooth discharge at the subsequent ports.

**Q.2** A weight of 15t is being lifted by a three-fold purchase, rigged to advantage. What minimum size of 6 x 37 wire rope can be used for the purchase if friction per sheave is 8% of weight? Find the efficiency of the system.

**Q.3** Describe briefly below:

- a) Precautions during COW.
- b) Zero calibration and span adjustment of explosimeter.
- c) PV valve and PV breaker.

**Q.4** Explain the hazards associated with the carriage of chemical and gas cargoes in tankers.

**Q.5** In the IMDG code, what is the purpose of segregation table? List and describe the various segregation terms used in the IMDG code.

**Q.6** What are the hazards associated with coal? What are the precautions to be taken during its carriage?

**Q.7** Discuss in details about how the IMSBC code and BLUE code assists the mariner.

- Q.8** i) Draw five different types of slings used in cargo handling.  
ii) Explain the Bay-Row Tier method of identifying containers on a container vessel.

- Q.9** a) Differentiate between ship's sweat and cargo sweat.  
b) A ship is loading rice cargo in winter in U.K. & destination is Mombassa (Kenya). How the ventilation is to be carried out for this cargo while on passage.

**Q.10** Explain the purpose of 'enhanced survey programme', CAS and CAP. How it helps detecting and rectifying damages within cargo holds?

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SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: NAVIGATION  
PAPER: CARGO HANDLING AND STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Question 1 & 2 are compulsory
2. Attempt any six out of Eight Questions
3. All Questions carry equal marks i.e. 25 Marks each.

**Q.1** A GYN tackle, the hauling part of which passes through a lead block, rigged to disadvantage is used to lift 8 MT, Find:-

- a. Effort
  - b. Efficiency of system; and
  - c. Minimum size of wire rope to be used
- Friction : 10%, safety factor 6

**Q.2** On departure, the ullage of a box shaped bunker tank (L: 26.4m, B: 11.47m & D: 9.13m) was 2.544 m (temperature 44.3<sup>o</sup>C), ullage pipe rises 107 cms above the top of the tank.

Enroute she transferred 108 cubic meters of the same oil at 26<sup>o</sup>C from her storage tank into this tank. Find her daily consumption if she arrived with 108 mt of oil remaining after sailing for 949 hours. The density of oil is 0.8313 ts/ cu. M at 15<sup>o</sup>C in vacuum. ASTM tables can be made use of.

**Q.3** Enumerate items which duty officers should attend to before during and after completion of loading operation.

- Q.4.** a) Explain various methods to control vapor space pressure in gas tanker tanks.  
b) Explain briefly NLS Category X and Category Y cargoes as per MARPOL Annex II.

**Q.5** In IMDG Code explain briefly the following:

- a) Marking, Labelling & Placards.
- b) UN No.
- c) MFAG

**Q.6** Your v/l has just received orders to load a project cargo consisting of heavy duty vehicles on deck. Describe the hazards associated while loading and the precautions you will observe as an officer of watch on board the vessel during the loading operations.

**Q.7** As per BLUE Code, explain the principle and procedures between the Ship & Terminal prior to cargo handling.

**Q.8** a) With the help of a sketch explain the principle of Bay Row Tier co-ordinates on board a container vessel in helping to identify the location of containers.

b) Sketch and label the various lashing material used in securing containers.

**Q.9** Describe the arrangements made to maintain the watertight integrity on board Ro-Ro vessels as regards bow, stern and side doors. Also, explain briefly the care and maintenance required for the same.

**Q.10** Explain the need for Enhanced Survey Programme (ESP) and also detail the procedure, planning, documentation and report of ESP?



# GOVERNMENT OF INDIA

Date: - 10<sup>th</sup> November-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: CARGO HANDLING & STOWAGE

TIME: 3 Hours

PASS MARKS: 120

MAX. MARKS: 200

Notes:

1. Question No. 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 questions.
3. All questions carry equal marks (i.e. 25 marks each)

**Q.1** A box shaped cargo tank of length 25m x 20m x 15m (L x B x H) is to be loaded ensuring 2%, volume of tank is always left for expansion. Load port temperature of the cargo is 25°C and maximum temperature expected during voyage is 35°C. Given the density of oil at 15°C (in vac.) is 0.8650 t/m<sup>3</sup>. Find

- a) Ullage on departure load port
- b) Weight of cargo in air (Assume vessel on even keel / Use ASTM Tables)

**Q.2** A ship's hold has a bale capacity of 500 m<sup>3</sup> and a grain capacity of 570 m<sup>3</sup> and is filled with maize stowing at 1.25 m<sup>3</sup>/t. it is now intended to discharge 100 tonnes of maize and load bagged maize in the same hold. (B.S. of bagged maize is 11%). The bags are 0.5m x 0.4m x 0.3m and weigh 50 kgs. What is the weight of bagged maize that can be loaded? (Assume bale capacity to grain capacity ratio constant through the entire hold)

**Q.3** A crude oil tanker has completed discharge of cargo and is now procedure to a layup berth for some hot work to be carried out in two of her cargo tanks. Describe all the procedures you will follow to prepare the tanks for man entry. On completion of work how will you prepare the tanks again for loading?

**Q.4** Write notes on Chain Register describing the following:- Competent person, Competent Authority, Responsible person & entries are to be made in Part 1, Part2, Part 3 of the chain register.

**Q.5**

- a. Explain the difference between a weathertight and watertight openings on ship.
- b. What are the concents and endorsements of Chain register? What purpose annealing of loose gear serve?

**Q.6**

- a. Describe shipper's responsibilities for shipping dangerous goods as per IMDG ccode.
- b. Explain the shifting hazard of loading grain in bulk and a method to prevent same in a FULLY filled hold.

**Q.7**

- a. On a RO-RO vessel, what are all the precautions taken while operating BOW doors?
- b. On a REEFER ship what is BRINE TRAP? Make a neat labelled sketch for same.

**Q.8**

- a. What factors must be borne in mind for making a BAY PLAN of a container ship?
- b. Write short notes on TARE weight & purpose of check digit of a container serial number.

**Q.9** Describe hazards of carriage of TIMBER deck cargoes. Why those hazards are not present if same cargo is loaded inside the ship's hold?

**Q.10** Write short notes on EHNAHNCED SURVEY, its objective and brief description on how it is done.

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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: CARGO HANDLING & STOWAGE**

**TIME: 3 Hours**

**PASS MARKS: 120**

**MAX. MARKS: 200**

Notes:

1. Question No. 1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 questions.
3. All questions carry equal marks (i.e. 25 marks each)

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**Q.1** A Tween deck of dimensions 9m x 6m x 4m has a permissible load density of 3.10 t/m<sup>2</sup>. Steel pipes (S.F 1.05 m<sup>3</sup>/t) and lub Oil drums (S.F. 1.85 m<sup>3</sup>/t) are to be loaded in the tween deck to fill all available space. Find maximum quantity of steel pipes and drums that can be loaded without exceeding load density?

**Q.2** A cylindrical tank of diameter 8m is 10m high 400 tonnes of oil of density 0.900 @ 15<sup>o</sup>C in vacuum is to be loaded in the tank at 28<sup>o</sup>C. Find the ullage, assuming to be 3.1416. (Use ASTM Tables).

**Q.3** Draw label and describe the Inert Gas system used on a crude oil tanker.

**Q.4** What are the hazards associated with sea transport of LPG/LNG cargoes in fully refrigerated tankers.

**Q.5** A Container loaded 'on deck' containing IMDG cargo was found to be dripping some of its cargo. A deck hand, who went to clean the same, inhaled toxic fumes and collapsed. What actions are required to be taken on board with respect to safety, health and pollution prevention?

**Q.6 a)** What are the hazards associated with carriage of concentrates and how these are overcome on board a general cargo ship.

**b)** What precautions are stated in the IMSBC code regarding loading of high density cargoes in bulk?

**Q.7** Write short notes on a) Cargo securing manual and b) effect of heavy deck cargo on stability of a ship.

**Q.8** Describe with the aid of neat and labelled sketches, securing of a locomotive on a multipurpose ship as per 'Code of safe practice for cargo stowage and securing'.

**Q.9** Describe the various types of containers based on size, material of construction and usage.

**Q.10 a)** Illustrate parts of a block. What maintenance and inspections should be carried out on a cargo block.

**b)** Describe the care and maintenance of standing rigging.

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GOVERNMENT OF INDIA  
SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL  
PAPER: CARGO HANDLING & STOWAGE

Code 21/2/12-A7

TIME: 3 HOURS

PASS MARKS: 120

MAX MARKS: 200

Notes:

1. Question No.1 & 2 are compulsory
2. Attempt any 6 out of remaining 8 questions
3. All questions carry equal marks (i.e. 25 marks each)

Q.1 In a box shaped cargo tank of dimensions 40x30x20 mtrs, cargo is loaded to an ullage of 1.1 mtrs at 25°C. Density of cargo at 15°C=0.8250 t/cbm. Find up to what temperature this oil has to be heated so that ullage will not fall below 1.0 mtr?

Q.2 A weight of 10 tonnes is to be lifted by a two-fold purchase rigged to advantage. The hauling part of this purchase is attached to the single sheave block of a luff tackle. Find the size of polypropylene rope, which has to be used for each purchase & the efficiency of the system. (Assume velocity ratio of the system to be the product of individual velocity ratios, friction-8% per sheave & factor of safety -6)

Q.3 a) Describe the ship-shore safety checks (at least 15 items) to be carried out on on oil tanker prior commencement of cargo discharging at the terminal

b) Enumerate the functions, limitations and method of use of Tank scope

Q.4 What are the hazards associated with NLS substances? Describe the precautions to be observed during cargo operations NLS substance in port?

Q.5 As per IMDG code differentiate between following:

- a) Effective closed and hermetically closed
- b) Stowage and Segregation
- c) Index and Dangerous Goods list
- d) EMS and MFAG
- d) UN No. and Class

Q.6 What is the purpose of BLU code? Lay out a typical ship shore safety check list filled prior starting cargo operation as per BLU code

Q.7 Describe with the aid of sketches the lashing of timber deck cargo that enables the ship to use timber load lines

Q.8 a) With the help of a suitable sketch, explain the stowage locations "070182", "090402" & "080384" as per the Bay plan

b) Briefly describe following container markings:

"STAU 445007[7]"

"US 4310"

Q.9 State the functions of dunnaging. List the various materials utilised for dunnaging cargoes and with a sketch show a typical layout of dunnaging for a cargo of steel coils

Q.10 Given two derricks and two winches, state how you would rig the derricks to load general cargo?

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JULY - 2012



GOVERNMENT OF INDIA  
SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: NAVIGATION  
PAPER: CARGO HANDLING AND STOWAGE  
PASS MARKS: 120

Code 87A

TIME: 3 HOURS

MAX MARKS: 200

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any six out of Eight Questions.
3. All Questions carry equal marks i.e. 25 Marks each.

Q.1 A tank measuring 21m X 16m X 16m has an ullage port extending 0.8m above the top of the tank. It is to be loaded with crude oil at 24 deg Celsius. 2% of the tank volume is to be left for expansion when maximum temperature expected during the voyage is 40 deg Celsius. (Density of oil=0.820 @ 15 deg Celsius in vacuum)  
(Use ASTM tables)

Find the:

- a) Mass of oil loaded.
- b) Ullage at load port.

Q.2 A weight of 13T is to be lifted using a 2-fold purchase rigged to disadvantage. The hauling part of this purchase is secured to the moving block of Gun tackle rigged to advantage. Calculate:

- a) Effort required to lift the load.
- b) Efficiency of the system.
- c) Size of Nylon rope required for the Gun tackle.  
(Given-Factor of safety: 6, Friction:8% of weight per sheave, velocity ratio of system equals product of individual velocity ratios).

Q.3 Write short notes on any two of the following (with sketches as applicable):

- a) Flammability Diagram
- b) Crude oil washing
- c) Centrifugal pumps

Q.4 Explain the precautions to be taken with respect to loading / discharging of Liquefied Gas Cargoes with respect to IGC code.

Q.5 In the IMDG code what is the purpose of segregation table?

List and describe the various segregation terms used in the IMDG code

Q.6 With respect to carriage of Grain in bulk, explain the hazards associated with it. Describe the preparations of hold for loading bulk grain.

- Q.7 a) What is the purpose of Code of safe practice for Cargo Stowage and Securing  
b) What are the principles of safe stowage & securing as per above code

- Q.8 a) With a suitable sketch show the markings on a container including information on CSC plate  
b) How is the position of a container identified using bay plan

Q.9 What precautions will you observe before and during the loading of a refrigerated cargo? State the difference between "Frozen" and "Chilled cargoes" with examples.

Q.10 a) Write short notes on Dock Safety Regulations.

- b) As Officer in charge of cargo watch, what are the checks you will perform on cargo gear prior allowing its use.

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GOVERNMENT OF INDIA  
SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: NAVIGATION  
PAPER: CARGO HANDLING AND STOWEAGE  
PASS MARKS: 120

Code 85A

TIME: 3 HOURS

MAX MARKS: 200

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any six out of Eight Questions.
3. All Questions carry equal marks i.e. 25 Marks each.

Q.1 A GYN tackle, rigged to disadvantage is used to lift 7.5 MT, Find:-

- 1) Effort.
  - 2) Efficiency of system.
  - 3) Size of nylon rope to be used.
- Friction: 10%, safety factor 6

Q.2 A Deep tank used as bunker tank on a VLCC measures 2.9 x 19.8 x 23.4 (L x B x D). It was 83% full (temperature 47.4° C) at the start of the voyage. ASTM tables may be used. Oil density at 15° C in vacuum is 0.8450t/m<sup>3</sup>. Calculate the quantity of fuel in the Tank.

Q.3 Sketch, label and describe the Inert Gas System used on a Crude Oil Tanker.

Q.4 a) What are the hazards associated with carriage of liquefied gas cargoes by sea?  
b) Describe the various categories of chemical cargoes transported in bulk by sea. Give two examples of each.

Q.5 With respect to IMDG Cargo briefly explain:

- a) Stowage
- b) Segregation "Away from"
- c) UN Number
- d) MFAG
- e) EMS

Q.6 What are the hazards associated with grain cargo. With respect to Grain Code, explain with neat sketch, any one method of ensuring that the effect of grain shifting inside a partly loaded compartment cannot endanger the vessel.

Q.7 As per BLU code (code of practice for safe loading and unloading of bulk carriers) prepare a Ship/Shore safety checklist for loading a dry bulk cargo in Bulk carriers.

Q.8 Describe what precautions would take for the stowage of

- a) Refrigerated containers
- b) Dangerous cargo containers

Q.9 a) What are the precautions to be observed before loading heavy lift using ship's gear  
b) When will you condemn a wire rope?

Q.10 Describe in detail how will you go about inspecting a cargo hold on completion of discharge of bulk cargo? What action would you take if any new damage is noticed?

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TIME: 3 HOURS

GOVERNMENT OF INDIA  
SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: NAVIGATION  
PAPER: CARGO HANDLING AND STOWAGE  
PASS MARKS: 120

Code 83A

MAX MARKS: 200

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any six out of Eight Questions.
3. All Questions carry equal marks i.e. 25 Marks each.

Q.1 A tank measuring 30m x 20m x 20m is to be loaded at 30°C with oil of density 0.85 at 15°C (in vacuum). If the maximum temperature expected during the voyage is 40°C, and 2% of the tank volume is to be left for expansion at that temp. Find Ullage of tank on completion of loading and Amount of cargo loaded, if top of the ullage pipe extends 0.6m above the tank top. (use ASTM tables)

Q.2 A derrick fitted with 3-fold purchase used to advantage is to lift a load of 22T. The cargo Runner wire is rove through the lead block on derrick head and heel on the way to the winch. What will be the size of wire (6X12) to be used when Factor of Safety is 6 and Friction is 10%. What will be the efficiency of the system?

Q.3 Draw, label and describe the Inert gas system used on a crude oil tanker.

- Q.4 a) What are the hazards associated with the carriage of liquefied gas cargoes?  
b) Explain the precautions to be taken in gas tankers with respect to IGC code?

Q.5 a) What precautions have to be observed while loading/discharging explosives in Packaged form?

- b) With respect to the IMDG code, explain the following with sketches as applicable:  
i) Separated From ii) Separated by a Complete Compartment or Hold from.

Q.6 What precautions must be taken before loading and during transit for a cargo of Bulk Coal for which shipper has declared that same is liable to spontaneous combustion.

- Q.7 a) Describe hazards of carriage of solid bulk cargo as per IMSBC (Bulk code).  
b) Define Angle of repose.

Q.8 a) Explain the procedure and precautions of operating BOW doors on RO-RO (Roll on - Roll off) ships.

- b) Explain the importance of maintaining watertight integrity of car decks and how is the same ensured.

Q.9 a) What are the precautions to be taken for loading deck cargo.  
b) Explain the effect of heavy lift:  
i) On stability ii) Sea worthiness of ship.

- Q.10 a) How would you make a damage report if you notice a new indentation on tank top While working cargo by shore stevedores?  
b) Write short notes on Cargo securing manual and its contents.

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JAN 2017

11/11/16



GOVERNMENT OF INDIA  
SECOND MATE OF A FOREIGN GOING SHIP  
FUNCTION: NAVIGATION  
PAPER: CARGO HANDLING AND STOWAGE  
PASS MARKS: 120

Code 86A

TIME: 3 HOURS

MAX MARKS: 200

Notes:

1. Question 1 & 2 are compulsory.
2. Attempt any six out of Eight Questions.
3. All Questions carry equal marks i.e. 25 Marks each.

11/11/2016

- Q.1 A Four fold purchase used to disadvantage can safely lift 12T, what is the smallest size of wire required to be used keeping in mind safety factor of 6?  
How much weight can be lifted safely if same wire is used in 3 fold purchase?
- Q.2 A ship has two identical box shaped tanks on Port & Starboard side, each measuring 12.9m x 9.83m x 17.89m (L x B x D). Both tanks were 93.4 % full at 37° C with oil of density 0.8771 t/m<sup>3</sup> at 15° C in vacuum.  
Use of ASTM tables is allowed. Calculate the total quantity of oil in these tanks.
- Q.3 Draw a neat flammability diagram and explain critical dilution line. Also explain following with the help of aforesaid diagram:-
  - a) Purging of tank atmosphere after tank cleaning.
  - b) Gas Freeing.
- Q.4 a) List the hazards involved while loading chemical cargoes in a chemical tanker.  
b) Describe the various types of tanks used for carriage of liquefied gas cargoes.
- Q.5 With respect to IMDG code
  - a) Explain Segregation table, MFAG, EmSWhat precautions are to be taken while loading/discharging explosives.
- Q.6 As per IMSBC Code, explain the associated hazards, precautions to be observed while Loading and transportation of the following cargoes:
  - a) Coal
  - b) Mineral Concentrates.
- Q.7 What is the purpose of BLU Code? List out a few points from the Ship-Shore Safety Checklist as mentioned in BLU Code.
  - b) What are the hazards associated with the carriage of Timber Deck Cargo?
- Q.8 Describe the various types of containers based size, material of construction and usage.
- Q.9 What preparations will you make prior to loading refrigerated cargo? What are the procedures to be followed for maintaining the temperature?
- Q.10 a) Write short notes on inspection and detection of defects in cargo spaces.
  - b) How will you check the weather tightness of hatch cover?

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## GOVERNMENT OF INDIA

### SECOND MATE OF A FOREIGN GOING SHIP OFFICER INCHARGE OF A NAVIGATIONAL WATCH

**FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL**

**PAPER: CARGO HANDLING & STOWAGE**

**TIME: 3 HOURS**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**NOTES:**

1. Question No.1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 questions.
3. All questions carry equal marks. (i.e. 25 marks each)

- Q.1** A tank measuring 20m x 12m x 15m contains un-pump able oil of 10 m<sup>3</sup> on arrival. Crude Oil of density 0.85 at 15 deg C (In vacuum) is to be loaded. 2% of the tank volume is to be left for expansion at all times. Loading temp. is 30 deg C & maximum temp expected during the voyage is 40 deg C, Correction factor for density is 0.0006 /°C. Find :
- a) Ullage of tank on completion of loading b) Amount of cargo loaded
- 0.229* *2954.94*
- Q.2** (a) A gun tackle rigged to advantage is used to lift a load of 10 tonnes. Find out the effort and minimum size of wire (6x24) required. *26*
- (b) If the hauling part of this purchase was secured to the moving block of a Luff tackle used to disadvantage, find out the effort required, efficiency of the system and minimum size of wire (6x24) required for the luff tackle. (Assume friction as 10% per sheave for both the purchases and use factor of safety 6). *1.73*  
*10, 64.261*
- Q.3** a. Draw and label a neat diagram of semi-dry type deck seal unit and describe its working.
- b. Enumerate and describe 10 points of Ship/Shore Safety Check List as per ISGOTT.
- Q.4** a) Draw and describe Independent "type C" tank of a gas tanker.
- b) As per IBC code explain any two ship types for carriage of Chemicals in bulk.
- Q.5** a) IMDG (International Maritime dangerous goods code) classifies various dangerous goods under different classes, write the objective behind same and what are the classes from class 1 to 9?
- b) State the Shippers responsibilities under IMDG code.
- Q.6** a. What precautions need be taken for loading high density bulk cargoes.
- b. Define angle of repose.
- Q.7** What are the dangers associated with carriage of deck timber cargo? Describe with suitable sketch the lashings carried out for logs carried on deck as per code of safe practice for ships carrying timber deck cargoes.

**Contd.....2.....**

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**Q.8** a. What are various types of containers in shipping trade?  
b. What is a CSC plate and its markings on a container?

**Q.9** a) What are the precautions to be taken for loading deck cargo.  
b) Explain the effect of heavy lift:  
i) On stability                      ii) Sea worthiness of ship

**Q.10** Describe in detail how will you go about inspecting a cargo hold on completion of discharge of bulk cargo? what action would you take if any new damage is noticed?

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## GOVERNMENT OF INDIA

### SECOND MATE OF A FOREIGN GOING SHIP OFFICER INCHARGE OF A NAVIGATIONAL WATCH

**FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL**

**PAPER: CARGO HANDLING & STOWAGE**

**TIME: 3 HOURS**

**PASS MARKS: 120**

**MAX. MARKS: 200**

**NOTES:**

1. Question No.1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 questions.
3. All questions carry equal marks, (i.e. 25 marks each)

- Q.1** A tank of dimension 23m X 19m X 17m is to be loaded with crude oil at 26 deg Celsius. It is desired to leave 3% of the volume of oil loaded for expansion when maximum temperature is 38 deg Celsius. (Density of oil = 0.840 @ 15 deg Celsius in vacuum). (Use ASTM tables).  
Calculate the following:
- a) Mass of oil loaded
  - b) Ullage at load port
  - c) Ullage in the tank when temperature rises to 32 deg Celsius
- Q.2** A weight of 13T is to be lifted using a 2-fold purchase rigged to disadvantage. The hauling part of this purchase is secured to the moving block of a Gun tackle rigged to advantage. Calculate:
- a) Effort required to lift the load
  - b) Efficiency of the system
  - c) Size of Nylon rope required for the Gun tackle.
- Q.3** Describe the procedures, hazards and precautions to be taken when carrying out COW operations.
- Q.4** What are the hazards associated with NLS substances? Describe the precautions to be observed during cargo operations of NLS substances in port?
- Q.5**
- a) Describe IMDG dangerous cargo manifest.
  - b) Explain packaging, Marking, Labelling, and Placarding requirements of dangerous Goods in packaged form with respect to IMDG code
- Q.6** Describe the hazards and precautions related to the sea transport of Concentrates and Iron ore fines
- Q.7** What are the hazards associated with timber deck cargo? State the required preparations before commencing to load timber on deck and on hatch coming.
- Q.8**
- a) What are the advantages and disadvantages of containerization?
  - b) Describe the various lashing materials used in securing containers on a container vessel.

contd.....2.....

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- Q.9.** a. Describe how a hold will be prepared to load refrigerated cargo?  
b. Explain why hold temperature recordings are important during transit of refrigerated cargo?
  
- Q10.** a) How would you make a damage report if you notice a new indentation on tank top While working cargo by shore stevedores?  
b) Write short notes on Cargo securing manual and its requirements.

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*6/5/16 - AM*

# GOVERNMENT OF INDIA

## SECOND MATE OF A FOREIGN GOING SHIP OFFICER INCHARGE OF A NAVIGATIONAL WATCH

FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL

PAPER: CARGO HANDLING & STOWAGE

TIME: 3 HOURS

PASS MARKS: 120

MAX. MARKS: 200

### NOTES:

1. Question No.1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 questions.
3. All questions carry equal marks. (i.e. 25 marks each)

**Q. 1** A box shaped tank of length 30m, breadth 18m and depth 20m is to be loaded at 26°C. A minimum ullage of 3.5m is to be maintained during the voyage on a maximum temperature of 37°C. Given the density of oil as 0.8250 at 15°C (in Vacuum). Find the:  
a) Mass of Oil loaded      b) Ullage at loading port  
c) Ullage during voyage, if the temperature unexpectedly rises to 45°C (Use ASTM tables)

**Q. 2** A derrick fitted with 2-fold purchase used to advantage is to lift a load of 26 T. The cargo runner wire is rove through the lead blocks on derrick head and heel on the way to the winch. What will be the size of wire (6X24) to be used when Factor of Safety is 6 and Friction is 8%. What will be the efficiency of the system?

**Q. 3** a) Explain the uses of following gas measuring instruments and how do they contribute towards safety of the ship and human lives on board a tanker:  
i) Explosimeter ii) Tank scope iii) Oxygen analyzer iv) Multi Gas Detector  
b) Describe advantages and disadvantages of Crude Oil washing. *will be changed*

**Q. 4** What information is provided on Material Safety Data sheet and also Explain various categories of cargoes on chemical tankers?

**Q. 5** What are the general precautions to be taken while loading explosive on board?

**Q. 6** With reference to the Grain Code, explain with a neat sketch, any one method of ensuring that the effect of grain shifting inside a partly loaded compartment cannot endanger the vessel

**Q. 7** What are the hazards associated with Sulphur? What are the precautions to be taken during its carriage?

**Q. 8** What is bay plan, how will you lash the containers on deck? Explain with diagram.

**Q. 9** What precautions will you observe before and during the loading of a refrigerated cargo. State the difference between "Frozen" and "Chilled" cargoes with examples.

**Q.10** a) With reference to Dock Labour Regulations, describe the following: (15 marks)

- i) Authorized Person ii) Competent Person iii) Responsible Person
- b) Explain the need for periodical inspection and load testing of cargo gear. How frequently should such inspections and tests be conducted? (10 marks)

**AMENDMENT TO CARGO QUESTION PAPER DATED 06/05/16****GOVERNMENT OF INDIA****SECOND MATE OF A FOREIGN GOING SHIP  
OFFICER INCHARGE OF A NAVIGATIONAL WATCH****FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL****PAPER: CARGO HANDLING & STOWAGE**

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**Note: Kindly replace question no 3 and amend to read as follows:**

**Q3. With the help of sketch, briefly explain arrangement on tankers and use of deck lines, drop lines, stripping lines, crossover valves, bypass valves, line master valves, drop valves and tank suction valves?**





# GOVERNMENT OF INDIA

## SECOND MATE OF A FOREIGN GOING SHIP OFFICER INCHARGE OF A NAVIGATIONAL WATCH

FUNCTION: CARGO HANDLING & STOWAGE AT OPERATIONAL LEVEL

PAPER: CARGO HANDLING & STOWAGE

TIME: 3 HOURS

PASS MARKS: 120

MAX. MARKS: 200

**NOTES:**

1. Question No.1 & 2 are compulsory.
2. Attempt any 6 out of remaining 8 questions.
3. All questions carry equal marks. (i.e. 25 marks each)

**Q. 1** MV TBN is to load in no 3 Tween deck(1200 m<sup>3</sup>) and lower hold ( 1700m<sup>3</sup>) the following cargo from Mumbai first then Cochin for discharge at Muscat first and then Dubai.

Cargo	SF(MT)	Weight(t)	Port of loading	Port of discharge
Ore	0.50	400	Mumbai	Dubai
Gunnies	1.70	500	Mumbai	Dubai
① Gunnies	1.70	400	Mumbai	Muscat
① Rubber	2.00	100	Cochin	Dubai
① Machinery	2.00	70	Cochin	Muscat
① Tea	3.10	80	Cochin	Muscat

- a) Prepare a stowage plan
- b) State quantity of Rubber you can load in remaining space of Muscat.

MM LH  
MD LH  
CRD  
LG DT

**Q. 2** A vessel having a tank 18m x 14m x 9m is to load oil of R.D 0.8236 at 15°C. the ullage pipe is 0.8m above the crown of the tank. The temperature of the Cargo while loading is 14°C. On completion of loading the ullage was 1.66m find the quantity loaded. If during the voyage the temperature of the Cargo rises to 32°C, find ullage then (use ASTM tables).

**Q. 3** Draw the diagram where appropriate and explain following.:

- a) Flammability diagram
- b) Tank scope
- c) Use of oxygen analyser

**Q. 4** What are the hazards associated with category with X,Y and Z substances. Describe the precautions to be observed during Cargo operations of NLS substances.

**Q. 5** What are the general precautions to be taken while loading explosive on board.

**Q. 6** Describe the precautions to take during loading and discharging coal in bulk and explain how coal should be ventilated at sea.

**Q. 7** How does IMSBC code divide various groups of Cargoes? What all things are required to be checked before accepting and loading a Cargo?

**Q. 8** What precautions will you observe before and during the loading of a refrigerated cargo. State the differences between "Frozen & Chilled Cargoes with examples.

**Q. 9** Write short notes on:

- a) Cargo sweat
- b) load density
- c) TML
- d) Breaking stress

**Q. 10** State your responsibilities as a Cargo Watch-keeping officer, and list out various checks you would make on Cargo appliances before permitting operations.

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