UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION

MARCH 2025 SEMESTER SESSION

SUBJECT CODE	:	**LOB20703**
SUBJECT TITLE	:	**CARGO AND HANDLING SYSTEM**
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	**BACHELOR IN MARITIME OPERATIONS**
TIME / DURATION	:	**09.00 AM - 12.00 PM (3 HOURS)**
DATE	:	**30 JUNE 2025**

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper **CAREFULLY**.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of **TWO (2)** sections; Section A and Section B.
4. Answer **ALL** questions from Section A. For Section B, answer **THREE (3)** questions **ONLY**.
5. Please write your answers on the **OMR** answer script and answer booklet provided.
6. Answer **ALL** questions in English language **ONLY**.

THERE ARE 12 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

Section A

Instructions: Please answer ALL the following questions in the OMR form given.

1. Identify the term used for securing cargo to prevent movement.
   A. Lashing
   B. Dunnage
   C. Ballasting
   D. Venting

2. Select the document that describes the condition and details of the cargo before departure.
   A. Bill of Lading
   B. Cargo Manifest
   C. Stowage Plan
   D. Mate's Receipt

3. Choose the main objective of proper cargo handling.
   A. Prevent damage and loss
   B. Reduce paperwork
   C. Improve sailing speed
   D. Minimise crew wages

4. Point out the most common method of lifting heavy cargo on board.
   A. Derrick
   B. Trolley
   C. Conveyor
   D. Forklift

5. _____ use to fill the empty space between the cargo and the ship's structure.
   A. Void
   B. Vent
   C. Free space
   D. Dunnage

6. Select the purpose of a cargo manifest.
   A. Lists details of all cargo on board
   B. Provides fuel information
   C. Shows crew duty roster
   D. Monitors ballast levels

7. Identify the type of cargo that requires ventilation to prevent sweating.
   A. Grain
   B. Steel
   C. Fertilizer
   D. Cement

8. Recognise the term used for arranging cargo in the hold.
   A. Stowage
   B. Trimming
   C. Dunnaging
   D. Ballasting

9. Identify the type of cargo most affected by humidity.
   A. Paper products
   B. Crude oil
   C. Scrap metal
   D. Motorcycles

10. Select the type of cargo that must not come into contact with water.
    A. Cement
    B. Timber
    C. Machinery
    D. Foodstuffs

11. Identify the responsible position for supervising cargo operations on deck.
    A. Chief Officer
    B. Bosun
    C. Second Officer
    D. Cook

12. Indicate the reason cargo should be evenly distributed.
    A. Maintains the ship's trim and stability
    B. Increases cargo quantity
    C. Improves crew efficiency
    D. Reduces port charges

13. Choose the general cargo that can be containerised for easier handling.
    A. Packaged food
    B. Bulk oil
    C. Coal
    D. Grain

14. Identify the ship document containing stowage arrangements.
    A. Stowage plan
    B. Garbage record book
    C. Engine log
    D. Sailing schedule

15. Identify the structure used to separate different types of cargo.
    A. Hatch
    B. Coaming
    C. Bulkhead
    D. Beam

16. Select the item used to protect cargo from ship movement.
    A. Lashing
    B. Radar
    C. Paint
    D. Propeller

17. Choose the condition required before loading refrigerated cargo.
    A. Pre-cooling
    B. Defrosting
    C. Warming
    D. Heating

18. Indicate the unit commonly used to measure cargo weight.
    A. Metric ton
    B. Cubic foot
    C. Barrel
    D. Gallon

19. Select the method of handling liquid cargo.
    A. Pumping
    B. Hoisting
    C. Slipping
    D. Grabbing

20. Name the equipment used to prevent cargo from falling during lifting.
    A. Net
    B. Hammer
    C. Valve
    D. Hook

21. Explain the reason fragile cargo is placed on top of heavier cargo.
    A. To prevent breakage from compression
    B. To balance the ship
    C. To increase cargo volume
    D. To optimise discharge speed

22. Interpret the reason ventilation is crucial for steel cargo.
    A. To help with stacking
    B. To avoid fire hazards
    C. To reduce bad odour
    D. To prevent condensation and rust

23. Indicate the effect of poor stowage of heavy machinery.
    A. Increases revenue
    B. Reduces loading time
    C. Causes damage to adjacent cargo
    D. Enhances lashing

24. Choose the right practice for handling water-reactive cargo.
    A. Mixed with dry goods
    B. Stored in wet lockers
    C. Kept away from moisture-prone areas
    D. Placed on deck

25. Select the appropriate sentences regarding the stowage requirements for refrigerated and dry cargo.
    A. Dry cargo needs sealed drums
    B. Refrigerated cargo requires temperature control
    C. Refrigerated cargo uses forklifts
    D. Dry cargo must be pre-cooled

26. Illustrate the risk of stowing oily rags with flammable materials.
    A. Increases fire hazard
    B. Improves air circulation
    C. Enhances cargo stability
    D. Reduces ventilation needs

27. Identify the influence of cargo weight on the development of a stowage plan.
    A. Heavier cargo is placed at the bottom for stability
    B. Lighter cargo goes below
    C. Heavier cargo is placed mid-ship
    D. All cargo is randomly arranged

28. Identify the main issue with stacking drums of chemicals.
    A. Drums increase ventilation
    B. Risk of leakage or explosion
    C. Drums are biodegradable
    D. No specific risk

29. Select the right stowage practice for perishable goods.
    A. Placed near ballast tanks
    B. Stored with dry chemicals
    C. Loaded in bulk
    D. Kept in reefer containers

30. The purpose of marking cargoes with handling symbols is _____.
    A. to decorate cargo
    B. to ensure correct handling and stowage
    C. to reduce cargo weight
    D. to avoid the use of dunnage

31. Show the impact of improper lashing on deck cargo.
    A. Reduces insurance cost
    B. Prevents corrosion
    C. Leads to shifting and possible loss overboard
    D. Makes discharge easier

32. Identify the reason livestock must be stowed with spacing.
    A. To allow movement and airflow
    B. To increase the cargo count
    C. To reduce feed
    D. To eliminate noise

33. Determine the outcome of placing incompatible chemicals together.
    A. Chemical reaction or explosion
    B. Faster discharge
    C. Reduced manpower
    D. Easier labelling

34. The importance of proper weight distribution in cargo holds is to _____.
    A. reduces fog
    B. improves speed
    C. maintains vessel stability
    D. enhances crew morale

35. Choose the method of stowing bales of cotton.
    A. Drenched in oil
    B. Combined with explosives
    C. Separated from flammable goods
    D. Mixed with liquids

36. Explain why glass cargo is cushioned before stowage.
    A. Absorbs heat
    B. Prevents breakage
    C. Increases weight
    D. Reduces value

37. Analyse the reason cement should be kept dry during the voyage.
    A. Prevents hardening and spoilage
    B. Enhances packing
    C. Reduces size
    D. Increases temperature

38. Clarify the danger of over-stowing food cargo with chemicals.
    A. Leads to contamination
    B. Improves taste
    C. Enhances labelling
    D. Decreases cost

39. Timber must be stacked in a criss-cross manner to _____.
    A. reduces fire hazard
    B. adds aesthetic value
    C. saves space
    D. ensures air circulation and stability

40. Describe the benefit of separating high and low flashpoint cargoes.
    A. Enhances paperwork
    B. Reduces temperature
    C. Improves lashing
    D. Minimises fire risk

Section B

Instructions: This section has FOUR questions. Please answer THREE questions only and write your answers in the answer sheet.

Question 1

The transportation of liquid bulk cargoes, particularly hazardous chemicals, aboard tankers presents significant operational and safety challenges. Efficient loading and unloading processes are crucial to maintaining safety, minimising contamination, and protecting the environment. Equally important is properly cleaning cargo tanks between voyages to prevent cross-contamination, especially when handling highly reactive substances. Specialised equipment plays a vital role in these operations, ensuring compliance with international safety standards and enhancing operational efficiency.

a) Determine the safety measures associated with cargo handling equipment and the importance of their application in preventing spills and accidents during cargo operations.

(10 marks)

b) Answer the questions based on the scenario given.

Scenario:
A chemical tanker has finished discharging its cargo and is now preparing to load a new shipment of a different type of chemical. The crew is tasked with cleaning the cargo tanks. The options available for cleaning are high-pressure water washing or a detergent-based cleaning solution. The crew is concerned about the time it will take to clean the tanks thoroughly and efficiently. The tanks are equipped with automated cleaning systems, but there is limited time before the new cargo needs to be loaded.

Evaluate the effectiveness of high-pressure water washing versus detergent-based cleaning for this scenario.

(10 marks)

Question 2

Bulk cargo handling involves specialised equipment and techniques to ensure efficient, safe, and contamination-free loading and unloading of grain, coal, ores, and fertilisers. The choice of equipment is crucial in optimising terminal operations, minimising cargo loss, and maintaining quality standards throughout the handling process.

a) Evaluate the selection of suitable cargo handling equipment for a specific bulk cargo operation involving coal discharge at a dry bulk terminal. Support your answer with justifications for the equipment chosen.

(10 marks)

b) Answer the questions based on the scenario given.

Scenario:

A bulk terminal has experienced several issues during the discharge of grain cargoes. The operation often results in grain spillage around the hopper area and noticeable delays in unloading times. Terminal operators have reported inconsistent flow rates from the ship's holds, and occasional equipment blockages have disrupted the workflow. These problems have led to increased cleanup costs and complaints from cargo owners regarding cargo quality and contamination.

Analyse the impact of the identified operational issues on the terminal's operational efficiency and cargo quality.

(10 marks)

Question 3

Efficient cargo handling is vital for smooth port operations, especially in multipurpose terminals accommodating diverse vessel types. Roll-on/Roll-off (RoRo) and Lift-on/Lift-off (LoLo) cargoes require different handling techniques and equipment, each with its operational strengths and limitations. Effective planning and equipment allocation are crucial when these vessel types arrive simultaneously to prevent delays and ensure productivity.

a) Apply knowledge of cargo handling equipment by comparing the operational procedures used for RoRo and LoLo cargoes regarding efficiency and equipment suitability.

(10 marks)

b) Answer the questions based on the scenario given.

Scenario:
At a multipurpose port, a newly recruited terminal planner must coordinate cargo operations for two incoming vessels, one RoRo and one LoLo, arriving simultaneously. The planner must select and allocate equipment efficiently without causing operational delays or resource conflicts.

Analyse the key factors that the planner should consider when selecting appropriate cargo handling equipment for each type of operation.

(10 marks)

Question 4

Efficient cargo handling is crucial in modern container shipping to ensure smooth port operations and minimise delays. Different container types—such as standard, refrigerated, flat-rack, tank, open-top, and high-cube—require specialised handling equipment and techniques. Ports must adapt their strategies to accommodate these variations while focusing on safety and efficiency. Properly using cranes, forklifts, and other machinery is essential for optimising operations and reducing wait times. Equipment selection must consider each container's weight, size, and special handling needs.

a) Describe a loading plan for a container ship that carries hazardous cargo, focusing on the handling equipment required to ensure safe and compliant cargo operations.

(10 marks)

c) Please answer the questions based on the scenario given.

Scenario:
A port is handling a ship carrying mixed loads, including several refrigerated (reefers), 40ft high-cube containers, and some 20ft open-top containers. There is limited capacity for connecting reefer plugs, and only one specialised crane for handling the open-top containers.

Evaluate the unloading priorities in this situation, focusing on the specific equipment needs for refrigerated and open-top containers.

(10 marks)

END OF EXAMINATION PAPER