



PENINSULA
COLLEGE
GEORGETOWN DK266-03(P)



UNIVERSITY OF
PLYMOUTH

FINAL EXAMINATION

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| Semester | : | JANUARY 2026 SEMESTER |
| Programme Name | : | BSC (HONS) MARITIME BUSINESS (LOGISTICS) 3+0 IN COLLABORATION WITH UNIVERSITY OF PLYMOUTH |
| Course Code & Name | : | MAL2041 MARITIME MANAGEMENT AND OPERATIONS |
| Duration | : | 3 HOURS |

INSTRUCTIONS TO CANDIDATES:

1. Please read the instructions given in the question paper **CAREFULLY**.
2. The question paper consists of **PART A AND PART B**.
3. Answer **ALL** questions from PART A and **ONE (1)** question from PART B.
4. Answers to the questions are to be written into the examination booklet.
5. Electronic dictionaries, lecture notes, files or any unauthorised materials except writing equipment are strictly prohibited.

This question paper must be submitted along with all used and/or unused rough papers and/ or graph papers (if any). Candidates are **NOT ALLOWED** to take any examination paper(s) used or unused out of the examination hall.

WARNING:

The Examination Board of Peninsula College Georgetown regards cheating as a very serious offence and will not hesitate to mete out the appropriate punitive actions according to the severity of the offence committed, and in accordance with the clauses stipulated in the Students' Handbook, up to and including expulsion from Peninsula College Georgetown.

(This booklet contains 4 printed pages including this page)

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ALLOWED TO DO SO

PART A

Answer **ALL** questions in **Part A** on the separate sheet provided. **[100 marks]**

1. a) The shipbreaking industry on the Indian subcontinent has been criticised for poor health, safety and environmental standards.
 - i) Briefly examine the environmental concerns, health and safety concerns associated with vessel scrapping in South Asia. (40 marks)
 - ii) Discuss measures that the international maritime community has taken, or proposed to address these concerns. (10 marks)

- b) The Straits Maritime Sdn. Bhd., a Malaysian shipowner headquartered in Penang, is planning to expand its fleet by commissioning three new vessels from Asian shipyards to meet growing demand in different cargo sectors. The procurement team is evaluating the following vessels:

| Vessel | Type | Deadweight (DWT) | Gross Tonnage (GT) |
|----------|-----------------|------------------|--------------------|
| Vessel A | Bulk Carrier | 38,000 DWT | 28,000 GT |
| Vessel B | Chemical Tanker | 20,000 DWT | 16,500 GT |
| Vessel C | LNG Carrier | 75,000 DWT | 95,000 GT |

CGT Reference Table (OECD):

| Ship Type | A | B |
|--------------------------|----|------|
| Bulk Carriers | 29 | 0.61 |
| Chemical Tankers | 84 | 0.55 |
| LNG Carriers | 32 | 0.68 |
| Oil Tanker (double hull) | 48 | 0.57 |
| Full Container | 19 | 0.68 |

*CGT Formula: $CGT = A \times GT^B$

- i) Calculate the Compensated Gross Tonnage (CGT) for all three vessels (Vessel A, Vessel B, and Vessel C) using the CGT formula and reference table provided. Show all workings clearly for each vessel. (15 marks)
- ii) Based on the CGT calculations in part (i), compare the relative construction complexity of the three vessels and discuss how the complexity difference affects the newbuilding price and shipyard selection for each vessel type. (35 marks)

Total: [100 marks]

PART B

Answer **ONE (1)** question in **Part B** on the separate sheet provided. **[100 marks]**

2. MT Cahaya Tanker, a product tanker, departs Port Klang, Malaysia, at 0800 hours Local Time (LT) on 10 April 2026. The vessel is bound for Thilawa Terminal, Myanmar, to discharge a cargo of Gas Oil.
Distance from Port Klang to Thilawa: 1,200 nautical miles
Vessel's service speed: 12 knots
Time Zones: Port Klang, Malaysia = UTC+8 | Thilawa, Myanmar = UTC+6:30
Laycan issued by Charterer: 13 April 2026, 0001 hrs – 15 April 2026, 2359 hrs (Thilawa Local Time, UTC+6:30)

- a) ETA Calculation and Time Zone Conversion
- i) Calculate the total steaming time for MT Cahaya Tanker from Port Klang to Thilawa. Show your working clearly. (10 marks)
 - ii) Using the steaming time calculated in part (i), determine the vessel's ETA at Thilawa in Port Klang Local Time (UTC+8). Show your working. (10 marks)
 - iii) Convert the ETA to Thilawa Local Time (UTC+6:30) and state clearly whether the vessel will arrive within the Laycan window. (10 marks)
- b) Pre-Arrival Preparations
MT Cahaya Tanker is now 24 hours away from Thilawa Terminal. As the Officer in Charge, you are responsible for ensuring the vessel is ready for berthing and cargo discharge operations. Describe the preparations that must be completed before arrival, covering the following:
- i) Communication and notifications — describe the messages and notifications that must be sent to the port authority, shipping agent, and terminal before arrival, and state the typical timing for each. (15 marks)
 - ii) Cargo and tank system readiness — explain the checks that must be carried out on the cargo system, including the condition of tanks, pipelines, pumps, and the inert gas system, to ensure the vessel is ready to discharge upon arrival. (25 marks)
- c) Tanker Terminal Safety Requirements
Upon arrival at Thilawa Terminal, the terminal representative boards the vessel to conduct a pre-transfer safety inspection.
- i) Explain the purpose of the Ship/Shore Safety Checklist and describe **FOUR (4)** items that are typically checked before cargo transfer operations are permitted to begin. (15 marks)
 - ii) State **THREE (3)** safety rules that apply at all times while a tanker is berthed at a petroleum terminal, and briefly explain the reason for each rule. (15 marks)
- Total: [100 marks]**
3. MV Suria Bulk, a Handymax bulk carrier of 45,000 DWT, is loading a cargo of iron ore fines at Port Klang, Malaysia, for a voyage to Tianjin, China.
- a) Bulk Cargo Hazards and Hold Preparation
- i) Iron ore fines is classified as a cargo that may liquefy under certain conditions. Explain the hazard of liquefaction, how it can affect the ship's stability, and what precautions the Master and officers must take before loading to prevent this. (15 marks)
 - ii) Before loading iron ore fines, the Chief Officer must inspect and prepare the cargo holds. Describe **FIVE (5)** key checks the Chief Officer must carry out during a hold inspection, explaining clearly why each check is important. (15 marks)
- b) Ship Stability Fundamentals
- i) Using clear explanations and diagrams, define the following stability terms: Centre of Gravity (G) | Centre of Buoyancy (B) | Metacentre (M) | Metacentric Height (GM) and explain the significance of each to safe cargo operations on a

bulk carrier. (20 marks)

- ii) Explain the difference between a stiff ship and a tender ship, including the effect on crew comfort, structural stress, and cargo safety. State what happens when G rises above M , and give **ONE** practical example of how this could occur during cargo loading on a bulk carrier. (20 marks)

c) Stress on Bulk Carriers

- i) Define hogging and sagging, and explain how improper cargo distribution during the loading of iron ore fines can cause these conditions. In your answer, identify which part of the ship's structure is most affected in each case. (15 marks)
- ii) As the Chief Officer of MV Suria Bulk, describe **FOUR (4)** practical steps you would take when preparing the cargo loading plan to distribute iron ore fines correctly across the holds, in order to minimise hull stress and maintain acceptable stability. (15 marks)

Total: [100 marks]

- END OF QUESTIONS -