



**UNIVERSITI KUALA LUMPUR**  
**Malaysian Institute of Marine Engineering Technology**

---

**FINAL EXAMINATION**  
**FEBRUARY 2025 SEMESTER SESSION**

---

**SUBJECT CODE** : LMB22103 / LMB23103

**SUBJECT TITLE** : MARINE AUXILIARIES 1

**PROGRAMME NAME** : BACHELOR OF MARINE ENGINEERING  
(FOR MPU: PROGRAMME LEVEL) TECHNOLOGY WITH HONOURS

**TIME / DURATION** : 09.00 AM – 11.30 AM  
(2 HOURS 30 MINUTES)

**DATE** : 2 JULY 2025

---

**INSTRUCTIONS TO CANDIDATES**

---

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

---

THERE ARE 4 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

---

**SECTION A (Total: 60 marks)****INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

With reference to shipboard heat exchangers:

- (a) Sketch and label SIX (6) double pass shell and tube heat exchanger. (6 marks)
- (b) Explain THREE (3) heat exchange process. (6 marks)
- (c) Sketch THREE (3) types of baffle plate arrangements in tube heat exchanger. (6 marks)
- d) State TWO (2) advantage of installing baffle plates. (2 marks)

**Question 2**

With reference to marine reciprocating air compressor:

- (a) State FOUR (4) application of air compressor onboard merchant ship. (4 marks)
- (b) Sketch a single stage reciprocating air compressor and label any SIX (6) components (10 marks)
- (c) Explain SIX (6) working principle in item (b). (6 marks)

**Question 3**

With reference to shipboard freshwater generator (FWG):

- a) Sketch a plate-type freshwater generator and label any EIGHT (8) components. (12 marks)
- b) State FOUR (4) components of tube freshwater generator and its function. (4 marks)
- c) State FOUR (4) reason of drop in FWG production during your watchkeeping. (4 marks)

**SECTION B (Total: 40 marks)**

**INSTRUCTION: Answer ONLY TWO (2) questions.**

**Please use the answer booklet provided.**

**Question 4**

With reference to marine Heating, Ventilation and Air Conditioning (HVAC) system:

- a) Define marine HVAC system. (2 marks)
- b) Sketch system in (a) and label any FOUR (4) components. (10 marks)
- c) State FOUR (4) objectives of HVAC system. (4 marks)
- d) State the function of the components below:
  - i. Compressor
  - ii. Air Filter
  - iii. Evaporator
  - iv. Blower fan(4 marks)

**Question 5**

With reference to marine steering gear system:

- (a) Sketch and label 2-ram hydraulic of marine steering gear system. (8 marks)
- (b) Explain FOUR (4) working principle of 2-ram steering gear (8 marks)
- (c) State FOUR (4) causes marine steering gear failure. (4 marks)

**Question 6**

With reference to marine pumps:

- (a) Define the purpose of a pump onboard ship. (2 marks)
- (b) Sketch a single action reciprocating pump and label any SIX (6) components. (8 marks)
- (c) Describe the pumping action in item (b) (4 marks)
- (d) Describe THREE (3) working principle of priming ejector (6 marks)

**END OF EXAMINATION PAPER**

