



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

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**FINAL EXAMINATION**  
**JULY 2025 SEMESTER SESSION**

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**SUBJECT CODE** : LMB23103

**SUBJECT TITLE** : MARINE AUXILIARIES 1

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

**TIME / DURATION** : 09.00 AM – 12.00 PM  
(3 HOURS)

**DATE** : 24 DECEMBER 2025

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**INSTRUCTIONS TO CANDIDATES**

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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)** Sections; Section A and Section B.
4. Answer **ALL** questions in Section A. For Section B, answer **TWO (2)** questions **ONLY**.
5. Please write your answers on the answer booklet provided.
6. Answer **ALL** questions in English language **ONLY**.

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THERE ARE 4 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

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**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) single 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) Discuss TWO (2) advantages of installing baffle plate. (2 marks)

**Question 2**

With reference to marine reciprocating air compressor:

- (a) State FOUR (4) application of compressed air onboard merchant ship. (4 marks)
- (b) Sketch and label SEVEN (7) components of a single stage reciprocating air compressor. (10 marks)
- (c) Explain SIX (6) working principle in item (b). (6 marks)

**Question 3**

With reference to shipboard tube type freshwater generator (FWG):

- a) Sketch and label SEVEN (7) components of a plate type FWG. (12 marks)
- b) State FOUR (4) components in item (a) and its function. (4 marks)
- c) Explain FOUR (4) reasons for the 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 and label system in (a). (10 marks)
- c) State FOUR (4) objectives of HVAC system. (4 marks)
- d) Explain 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 FOUR (4) component of a 2-ram marine steering gear system. (8 marks)
- (b) Explain FOUR (4) working principle of a 2-ram steering gear (8 marks)
- (c) Discuss FOUR (4) causes of the 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 and label THREE (3) components of a single action reciprocating pump. (8 marks)
- c) Explain the working principle in (b). (4 marks)
- d) Describe THREE (3) working principle of priming ejector pump. (6 marks)

**END OF EXAMINATION PAPER**

