

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations– June 2026
Programme Name: B Tech (ME)
Semester: IV
Subject Code: UG11T5402
Subject Name: Marine Auxiliary Systems

Date: 04.06.2026

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section.

Section A
(All questions are compulsory)
(10 x 1 = 10 Marks)

1. If you observe a pipeline having yellow stripes on a white background, the pipeline will contain: **(1Marks)**

- a) Heavy fuel oil.
- b) Control air
- c) Lubricating oil
- d) Steam.

2. With reference to Fresh water Generator on board; which of the following method is used for scale removal from evaporator surface: - **(1Marks)**

- a) In-service treatment
- b) Descaling by acid
- c) Both a & b
- d) None

3. Air blowing out from the intake air filter of an operating air compressor Indicates --- **(1Marks)**

- a) Broken Inlet valves
- b) Pulsations in the air system
- c) Overloading
- d) None of the above

4. Bow thruster is used to control the movement of the vessel when the vessel is at: **(1Marks)**

- a) High speeds only.

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- b) Low speeds only.
 - c) Only to be used by pilot.
 - d) All of the above.

5. Sacrificial anodes are fitted on the **(1Marks)**

- a) Shell of a shell and tube heat exchanger
- b) End Cover of a shell and tube heat exchanger
- c) Back plate of a Plate type heat exchanger
- d) Front plate of a Plate type heat exchanger

6. Which of the below equipment is **NOT** fitted on bottom platform of ship: **(1Marks)**

- a) Incinerator.
- b) Oily Water Separator.
- c) Fire and General Service Pump.
- d) Lube Oil Purifier.

7. Which material is most suitable for sea water cooled heat exchanger tubes due to high resistance to corrosion? **(1Marks)**

- a) Mild Steel
- b) Aluminium
- c) Titanium or Cupro-nickel
- d) Cast Iron

8. Which of the following pipelines would typically use a hydrophore system? **(1Marks)**

- a) Steam pipeline
- b) Bilge pipeline
- c) Freshwater pipeline
- d) Firefighting pipeline

9. Copper anodes in an MGPS system: **(1Marks)**

- a) Form a protective barrier to the steel pipework.
- b) Neutralizes the acidic nature of sea water flowing through the pipework.
- c) Minimizes the marine growth within the pipework.
- d) Protects the hull against corrosion.

10. In a ship's central cooling system, what is the purpose of the Central Fresh Water Heat Exchanger? **(1Marks)**

- a) To directly cool engine parts with seawater
- b) To transfer heat from the freshwater circuit to the sea water circuit
- c) To heat the sea water
- d) To cool the lubricating oil directly.

Section B

(All questions are compulsory)

(5 x 2 = 10 Marks)

11. Name 5 equipment that are fixed in the Bottom Platform of a Merchant Vessel. **(2 Marks)**
12. What is the purpose of using colour codes for pipelines in an engine room? **(2 Marks)**
13. List two types of pipelines typically found in an engine room that use valves with special materials for corrosion resistance. **(2 Marks)**
14. Explain effect of "entrained air" in a heat exchanger. What means is provided for its removal? **(2 Marks)**
15. What are the advantages of multi stage compression ? **(2 Marks)**

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16. (a) Sketch a Two stage Air compressor and explain the various safety devices fitted on the system. **(7 Marks)**
16. (b) What are the uses of Compressed air on a ship? **(3 Marks)**
17. (a) Draw a layout of Bottom Platform of a Ship's Engine Room and show different machineries / equipment **(5 Marks)**
17. (b) State the function of each given below: **(5 Marks)**
 - i. Sea Chest
 - ii. Emergency Fire Pump.
 - iii. Emergency Bilge Suction.
 - iv. International Shore Connection.
 - v. Incinerator.

Write short notes on the following:-

18. (a) Ship Stabilizers **(5 Marks)**
18. (b) Hull Protection arrangements. **(5 Marks)**

19. (a) State with reason the type of heat exchangers used for the following:

- Lubricating oil coolers.
- Fuel oil Heaters.
- Fresh water Coolers.
- Compressed air coolers.
- Fresh water heaters.
- Steam condenser.

(6 Marks)

19. (b) Please specify the necessary treatment of water produced by fresh water generator before human use? **(4 marks)**

20. (a) Sketch a simple line diagram showing the bilge pumping system for an engine room. **(5 Marks)**

20. (b) What is the function of a 'tell-tale' hole in the gasket of a plate type heat exchanger? **(3 Marks)**

20. (c) Give a list of different colour codes used on ships with respect to different piping system. **(2 Marks)**

21. (a) Describe with a simple line sketch a shell and coil type evaporator? Name the materials used for the principal parts? **(6 marks)**

21. (b) Write brief notes on the following:

- i. Diesel electric propulsion.
- ii. Steam propulsion.

(4 Marks)

22. (a) Describe with a line sketch a domestic fresh water (Hydrophore) system and explain how water pressure is maintained? **(5 marks)**

22. (b) Describe with a sketch of the plate type surface heat exchanger? **(5 marks)**
