
Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2025
Programme Name: B Tech (ME)
Semester: 3
Subject Code: UG11T5305
Subject Name: Marine Boilers

Date: 16.12.2025

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

Ten MCQs of 01 Mark each – Choose the correct answer as applicable.

1. For which of the following use, saturated steam is suitable?
 - a. Operating steam turbine
 - b. Heating purpose
 - c. Blowing economiser soot
 - d. Atomising the fuel oil
2. Which of these tubes have the largest diameter?
 - a. Generating tubes
 - b. Water wall tubes
 - c. Screen tubes.
 - d. Down-comers
3. The Pressure vessels are given _____ ends to avoid bursting
 - A) Flat
 - B) Hemispherical
 - C) Triangular
 - D) Square
4. The most important reason for not reducing boiler exhaust temperature below certain point.
 - a. Proportionately more heat surface area needed to extract that heat.
 - b. Avoid dew point being reached which will lead to corrosion
 - c. Lower temperature will increase deposition

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- d. Fire hazard in uptake.
5. Oil Contamination of boiler water can be first detected at...
- A) Make up feed water tank
 - B) Boiler drain tank
 - C) Observation tank
 - D) Economizer
6. Steam pressure in a main engine exhaust gas economiser is prevented from exceeding working pressure by:
- a. Regulating circulating water
 - b. Lifting safety valve manually to release excess pressure
 - c. Using a dumping steam condenser
 - d. Using excess steam in bunker tanks
7. What immediate action will you take on discovering that boiler has been firing without any water visible in the gauge glasses?
- a. Inform the duty engineer
 - b. Investigate the reason for low water level
 - c. Start feed water pump
 - d. Stop the burner
8. Hydrazine is a chemical added to the boiler feed water to remove
- a. Hydrogen
 - b. Oxygen
 - c. Nitrogen
 - d. Carbon di-oxide
9. Alarm in the boiler control panel when photocell light start flashing indicates
- a. There is no fuel in the tank
 - b. There is no flame in the furnace
 - c. There is no steam in the drum
 - d. There is no water in the drum
10. Identify the component which is NOT a boiler mounting
- A) Main Steam Stop valve
 - B) Vent valve
 - C) Blowdown valve
 - D) Super heater

Section B

Five Questions of 02 Marks each

11. List uses of steam on board merchant vessels.
12. Explain importance of having a vent / air release valve on Boiler drum.
13. Describe four means to check the correctness of combustion inside the boiler furnace.
14. Enlist the conditions leading to boiler shutdown essential for safe boiler operation.
15. If a boiler tube ruptures, how can it be repaired to resume the boiler operation?

Section C

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

- 16 (a) a) Explain fire tube type boiler with the help of a simple diagram. (5 marks)
- 16 (b) Explain Staying of flat surfaces exposed to pressure to avoid deformation. (5 Marks)
- 17 (a) Describe with a sketch the construction and working principle of a "forced circulation boiler". (7)
- 17 (b) Distinguish between primary and secondary flames. (3)
- 18 (a) Sketch and describe the construction and operation of a reflex type gauge glass. (7)
- 18 (b) Describe accumulation pressure test, lifting pressure and blowdown (pressure drop) of safety valves. (3)
- 19 (a) Explain combustion process in a furnace of a boiler. (5 marks)
- 19 (b) Explain procedure of changing over from High Sulphur HFO to Low Sulphur MGO. (5 marks)
- 20 (a) Sketch and explain the working of a soot blower. (7)
- 20 (b) Explain the means provided in a hot well to prevent contamination of feed water with oil. (3)

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- 21 (a) What are the objectives of boiler water treatment? (3)
- 21 (b) Describe the Phosphate test procedure with its limits, chemical and dosage used for treatment. (3)
- 21 (c) a) Explain procedure for cleaning tubes of a water tube boiler (4 marks)
- 22 (a) Explain step by step procedure of raising steam from a cold boiler. (6)
- 22 (b) What is meant by "blow-back", what are its causes and how it can be avoided? (4)