

Indian Maritime University
(A Central University, Govt of India)

Supplementary Examinations – September/October 2024

Programme Name: B Tech (ME)

Semester: IV

Subject Code: UG11T4406

Subject Name: Marine Boilers and Steam Systems

Date: 08.10.2024

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/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. Service steam produced from the Auxiliary Boiler is delivered at a pressure of _____ bars.
 - a. 2
 - b. 7
 - c. 10
 - d. 15
2. Function of a dump valve is
 - a. dumps surplus steam at high pressure to the condenser
 - b. dumps surplus steam at high pressure to the exhaust boiler
 - c. dumps surplus steam at high pressure to the boiler
 - d. dumps feed water at high pressure into the exhaust boiler
3. Scum Blow down Valve is used to remove _____ from the Steam drum.
 - a. Steam
 - b. Water
 - c. Oil and floating solids
 - d. Air
4. Which of the following Burner has the maximum Turn Down Ratio?
 - a. Pressure jet Burner
 - b. Rotary Cup Burner
 - c. Steam Jet Burner

d. All burners have same Turn Down Ratio

5. What is the maximum lifting pressure of a boiler safety valve, considering the maximum working pressure of a boiler?

- a. 5% above max working pressure
- b. 7% above maximum working pressure
- c. 10% above the maximum working pressure
- d. Not more than 3% above the maximum working pressure

6. Hydrazine is a chemical that is used to remove _____ from Feed Water.

- a. Fuel Oil
- b. Sea Water
- c. Oxygen
- d. Lube Oil

7. In the absence of Steam, the Steam Jet burner utilises _____ to atomise the Fuel.

- a. Pressurised Lube Oil
- b. Compressed Air
- c. Pressurised Water
- d. None of the above

8. Blow back occurs in a Boiler due to accumulation of _____ in the furnace of the Boiler.

- a. Feed Water
- b. Lube Oil
- c. Steam
- d. Hydrocarbon vapour

9. Oil Contamination of boiler water can be first detected at

- a. Observation tank
- b. Boiler drain tank
- c. Make up feed water tank
- d. Economizer

10. Identify a condition which does not cause a boiler shut down --

- a. Low Low water level
- b. Flame failure
- c. FD fan trip
- d. High water level

Section B

Five Questions of 2 Marks each

11. State tests carried out on boiler material.
12. Briefly explain the function of Feed check valves fitted to a boiler.
13. Enlist the conditions leading to boiler shutdown essential for safe boiler operation.
14. Higher turn down ratio is desirable. Justify.
15. Write short notes on Down comers & Steam Drum of a water tube boiler.

Section C

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

16.
 - a. Explain the need and process to change over of High Sulphur Heavy Fuel Oil to low Sulphur Gas Oil. (5 marks)
 - b. Explain working of CO₂ analyser in brief with appropriate diagram. (5 marks)
17.
 - a. Scaling inside the Boiler tubes can be disastrous. Justify. (5 Marks)
 - b. Explain the concept of Acid cleaning of Boilers (5 Marks)
18. With the help of simple sketch, explain the Boiler Feed Water System showing closed loop of boiler circulating water through Exhaust Gas Economiser. (10 marks)
19.
 - a) Explain procedure for flashing up of boiler from cold. (5 marks)
 - b) State and briefly explain the tests carried out on boiler water. (5 marks)
20.
 - a. Boiler being a pressure vessel needs to be protected by alarms and trips. Enumerate a few. (5 Marks)
 - b. State the function of flame eye and its importance in Boiler Automation. (5 Marks)
21.
 - a. List all the Mountings on the Auxiliary Boiler. (6 Marks)
 - b. Refractories are needed in a Boiler. Explain. (4 Marks)
22.
 - a. Explain construction and operation of Rotary cup type burner with a neat sketch. (7 marks)
 - b. State advantages and disadvantages of Rotary cup type burner. (3 marks)

