

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2023
Programme Name: B Tech (ME)
Semester: 4
Subject Code: UG11T4406
Subject Name: Marine Boilers and Steam Systems

Date: 28.11.2023

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. A Boiler having it's own furnace together with arrangement for passing Main Engine exhaust gases, is known as

- A) Composite boiler
- B) Babcock boiler
- C) Attemperator
- D) Incinerator

2. The boiler feed water temperature with open feed system should be

- A) as low as possible
- B) above 85 deg Celcius
- C) below 50 deg celcius
- D) lukewarm

3. The Pressure vessels are given _____ ends to avoid bursting

- A) Flat
- B) Hemispherical
- C) triangle
- D) Square

4. Type of boiler burner with highest turn down ratio is

- A) Pressure jet
- B) Rotary cup
- C) Steam assisted atomising type
- D) Ultrasonic

5. Identify a boiler mounting

- A) Steam drum
- B) Vent valve
- C) Water drum
- D) Cascade tank

6. 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

7. 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

8. Possibility of boiler furnace explosion is eliminated by

- A) fitting TDS sensor
- B) ample pre and post purging operation
- C) supply of inert gas
- D) auto shut down

9. Process of removal of carbon, ash deposits from superheater/economizer coils is termed as

- A) Blowing through
- B) Soot blowing
- C) Bypassing
- D) Blowing down

10. Test carried out after major repairs to the boiler pressure parts -

- A) Ultrasound test
- B) Magnetic crack detection test
- C) Hydraulic pressure test
- D) Alkalinity test

Section B

Five Questions of 02 Marks each

11. State causes of boiler furnace blow back.
12. List uses of steam on board merchant vessels.
13. State tests carried out on boiler material.
14. Explain purpose of feed water distribution unit in steam drum of a water tube boiler.
15. Enlist the conditions leading to boiler shutdown essential for safe boiler operation

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) Sketch and explain function of a soot blower fitted at economizer section. (5 marks)
b) Explain water-cooled type attemperator employed for superheated steam temperature control. (5 marks)
18. Sketch and describe Open type feed water system employed for Auxiliary boiler. (10 marks)
19. 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)
20. a) Explain working of a reducing valve with the help of a simple diagram (7 marks)
b) State a list of boiler mountings. (3 marks)

21. 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)

22. a) State the action in the case of boiler water contamination by oil. (5 marks)

b) Explain procedure of laying up of a boiler for extended period of shut down. (5 marks)

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