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

End Semester Examinations – December 2025

Programme Name: B Tech (ME)

Semester: 5

Subject Code: UG11T4504

Subject Name: Marine Steam Plant

Date: 12.12.2025

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. Which of the following steam machinery is not commonly used on motor ships?
 - a. Cargo oil pump turbine
 - b. Steam driven mooring winch
 - c. Stripping pump
 - d. Turbo gas freeing fan

 2. Class I pipes for steam systems are those which have
 - a. Pressure greater than 7 bar and temperature greater than 170°C
 - b. Pressure greater than 10 bar and temperature greater than 200°C
 - c. Pressure greater than 16 bar and temperature greater than 300°C
 - d. Pressure greater than 60 bar and temperature greater than 500°C

 3. Main propulsion turbine condenser vacuum is maintained at 0.05 bar because
 - (a) it helps in better deaeration
 - (b) it provides scope for better heat transfer
 - (c) it allows for greater enthalpy drop in the turbine
 - (d) it reduces the volume of steam and thus size of condenser

 4. Which of the following condensate does not return to the hot well?
 - a. Condensate from the calorifier
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- b. Condensate from line tracing
 - c. Condensate from bunker tanks
 - d. Condensate from air conditioner evaporator
5. What is the operating mechanism of a thermodynamic type steam trap?
- a. Movement of the valve due to expansion or contraction of metallic bellows
 - b. Movement of the disc due to dynamic effect of flash steam
 - c. Movement of float in response to condensate buildup
 - d. Movement of thermostatic element in response to temperature changes
6. What is the consequence of exhaust gas temperature falling below the dew point in a waste heat recovery boiler?
- a. Formation of sulphurous acid vapour leading to corrosion.
 - b. Reduced emissions.
 - c. Increased fuel efficiency.
 - d. Improved steam production.
7. From where is the auxiliary steam for heating purpose obtained in main boilers?
- a. From steam drum outlet
 - b. From superheater outlet
 - c. From desuperheater outlet
 - d. From economiser outlet
8. Select the correct statement
- a. For Chloride test titration is carried out with N/50 sulphuric acid
 - b. Magnesium Sulphite is used as an Oxygen Scavenger.
 - c. Sea water contains about 30 ppm of Calcium Sulphate.
 - d. Sodium Chloride does not form scales in boiler.
9. What does the turn down ratio in a steam boiler indicate?
- a. The ratio of maximum to minimum steam production
 - b. The ratio of maximum to minimum firing rates
 - c. The ratio of steam output to water input
 - d. The ratio of water pressure to steam pressure
10. Which of the following statement is correct with regards to Boiler survey?
- a. Waste heat recovery boilers are to be surveyed once every 5 years.
 - b. Auxiliary boilers are to be surveyed every year.
 - c. For vessels fitted with more than one main boiler, survey interval should not exceed 36 months.
 - d. Fire/Smoke tube boilers are to be surveyed every 3 years

Section B

Five Questions of 02 Marks each

11. What is water hammer, how is it caused, what are its effects and how to prevent it? *TMI*
12. What is the need for insulating the steam pipes and which materials are commonly used for this purpose? *TMI*
13. What is the advantage of a cross-compound propulsion turbine, how is the astern movement of ship is provided by this turbine?
14. Discuss the implications of using fixed orifice traps in steam systems susceptible to varying load conditions.
15. Explain furnace Pressure control

Section C

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

- 16 (a) Explain various steam motive powers used on motor ships and briefly describe their specific purpose (5 marks)
- (b) List out the various recommended parameters for boiler water with corresponding units (minimum 5). You may assume a water tube boiler with design pressure of 20 bar. (5 marks)
- 17 (a) Explain the criteria for pipe sizing, importance of flow velocity. Explain NPS and Schedule number with reference to piping. (6)
- (b) Explain stalling in heat exchangers. What are its effects and how to prevent it? (4) *TMI*
18. (a) With a schematic sketch explain the layout of a Steam ships condensate Feed system? (5 marks)
- (b) Make a comparison between thermal oil & steam systems (5 marks)
- 19 (a) What are the key factors that favours for using steam as main propulsion system in comparison to a motor vessel. (5)
- (b) Explain the importance of 'Heat balance diagram' for a steam plant. (5)
- 20 (a) Explain the need for removal of Oxygen from boiler water and the working principle of a deaerator. (5) *TMI*
- 20 (b) Draw the layout of waste heat recovery system for a motor ship showing the flow of various fluids. The waste heat recovery should include three
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uses of engine exhaust gases, one each use of jacket cooling water and combustion air supply. (5)

21 (a) Explain two term water level control system with suitable diagram. (7)

(b) Explain safety interlocks in boiler controls. (3)

22 (a) Write down the step wise procedure for preparing a boiler for shutting down and making it ready for survey. Write the survey interval for boilers (Single main boiler, Multiple main Boilers, auxiliary) (5 marks)

(b) Write a short note on boiler water treatment chemicals used and explain how dosage is calculated? (5 marks)

TMI

TMI

TMI

TMI

TMI

TMI
