Indian Maritim2e University

(A Central University, Govt of India)

End Semester Examinations – December 2024

Programme Name: B Tech (Marine Engineering)

Semester: V

Subject Code: UG11T4504

Subject Name: MARINE STEAM PLANT

Date: 13.12.2024	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 of 01 Mark each – Choose the correct answer as applicable.

1. In a steam heater, if the amount of heat extraction from the steam to the secondary fluid is increased substantially, then (LMTD) (logarithmic mean temperature difference) will become
a) Smaller
b) Larger
c) Remains constant
d) No effect on heating

2. Which of the following is a major component found in a Thermal Fluid Heating system
a) Steam trap
b) Condenser
c) Steam separator
d) Deaerator

3. Efficiency of a thermal cycle increases by

a) Regeneration
b) Reheating of steam
c) Both (a) and (b)
d) Cooling of steam

4. 100% efficiency of a thermal cycle cannot be achieved because of

a) Frictional losses
b) It is not possible to achieve 0°K temperature
c) Leakages
d) Non-availability of ideal substance

5. Waste heat recovery boiler helps to _____ overall efficiency of the engine plant.

a) No effect
b) Decrease
c) First increases and then decreases
d) Increase

6. Without considering Waste Heat Recovery System (WHRS), if heat energy input by the fuel taken as 100%, then heat energy goes with the exhaust gas is approximately equals to
a) 0.5 to 0.6%
b) 5 to 8%
c) 25 to 32 %
d) 45 to 65%

7. The Blow down control is not carried out to
a) Adjust the corrosion tendencies of boiler water
b) Adjust the chloride and acidic content of boiler water
c) Adjust the scaling tendencies of boiler water
d) Adjust the heat content of boiler water

8. Which of the items are excluded under boiler survey
a) Steam receivers and reservoirs
b) Thermal oil heating systems
c) Exhaust gas economiser
d) Exhaust gas receivers

9. Which of the following statement is correct?

a) The efficiency of steam turbines is greater than steam engines
b) A flywheel is a must for steam turbine
c) The turbine blades do not change the direction of steam issuing from the nozzle
d) The pressure of steam, in reaction turbines, is increased in fixed blades as well as in moving blades

10. Which branch of the following type of condensate line in a steam propulsion plant system sometimes carry flash steam

a) Common return line from steam trap
b) Drain line to trap
c) a pumped return line
d) none of these

Section B

Answer all. Five Questions of 02 Marks each

11. As per pipe line standards, what is nominal pipe size?
12. Mention the various uses of steam on board ships.
13. What are the causes of water hammer?
14. Why the condensers preferred to run at vacuum in a steam plant?
15. What is meant by stalling in heat exchangers?

Section C

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

16. With a neat sketch explain typical pipeline diagram of marine steam plant system integrated with turbo generator and waste heat recovery boiler. (10)

17. (a) Why the condensate is reused in a steam system? (3)
    (b) Explain the type of thermostatic steam trap working on liquid expansion principle. (4)
    (c) What is tracing steam lines? How they are located with the system piping (3)

18. (a) Explain the advantages and disadvantages of thermal oil boiler system. (7)
    b) What are the safety devices fitted on a marine boiler? (3)

19. Explain with a neat sketch of arrangement of components, working of marine steam propulsion plant. (10)

20. Explain in detail the procedure for shutting down the boiler and making safe for inspection and survey. (10)

21. (a) What are the two basic types of desuperheaters found in modern steam propulsion plants on board ships. (3)
    (b) What are the general checks carried out for the survey of safety valves of a boiler? (3)
    (c) Why the water is carried over into the steam flow? (4)

22. Explain in detail various methods of improving efficiency of a marine steam propulsion plant with suitable sketches. (10)