

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

Supplementary Examinations – March/April 2024
Programme Name: B TECH(ME)

Semester: V

Subject Code: UG11T4503

**Subject Name: MARINE AUXILIARY SYSTEMS AND DECK
MACHINERY**

Date: 28.03.2024

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

Choose the correct answer. All questions are compulsory.
[10x1=10 marks]

1. A Diaphragm pump is a type of
 - a. Positive displacement pump
 - b. Rotodynamic pump
 - c. Axial flow pump
 - d. Centrifugal pump.
2. Sea Water is boiled in a fresh water generator in the temperature range of
 - a. 16 to 20 deg C
 - b. 36 to 45 deg C
 - c. 80 to 90 deg C
 - d. 115 to 130 deg C
3. Sacrificial anodes are used in
 - a. Purifiers
 - b. Main air compressors
 - c. Shell and tube type heat exchanger
 - d. Auxiliary engines

4. NPSH of a centrifugal pump stands for
 - a. No Priming Still head
 - b. Net Proof Suction head
 - c. No Priming suction head
 - d. Net Positive suction head

5. In case of Engine room fire, the Fusible plug is fitted on an Air Bottle releases air into
 - a. Main Engine
 - b. Engine room
 - c. to a location outside the Engine room.
 - d. to the Bilges

6. Pressurisation of the crankcase in an air compressor is prevented by
 - a. Relief valve
 - b. Oil Level switch
 - c. Oil Pressure switch
 - d. Breather pipe.

7. Baffle plates are used in a heat exchanger to
 - a. cause turbulent flow by diverting the liquid
 - b. cause laminar flow by diverting the liquid
 - c. support the end cover
 - d. support the shell

8. Fuel oil is heated to a temperature of _____ in a purifier.
 - a. 50 deg C
 - b. 95 deg C
 - c. 110 deg C
 - d. 145 deg C

9. Fuel can only be stored in bunker tanks till a maximum temperature of
 - a. 20 deg C
 - b. 40 deg C
 - c. 60 deg C
 - d. 80 deg C

10. The Anchor chain passes into the sea through the _____.
 - a. Hawse pipe
 - b. Copper pipe
 - c. Spurling pipe
 - d. Steam pipe

Section B

Short Answer type question. All questions are compulsory. [5x2=10]

11. Justify the use of Positive displacement pumps for Lube oil and fuel oil applications.
12. Is the water produced by Fresh Water Generator safe to drink? What will be the remedy?
13. How do you protect the intercooler and aftercooler of a Main Air compressor from Overpressure?
14. What is the need for purification of Fuel oil on board? Justify.
15. What is the difference between Winch and windlass?

Section C

Answer any 5 question. Each question carries 10 marks. [5x10=50]

16. a) Explain the principles of a centrifugal pump referring the purpose of impeller diffuser & volute casing? Support your answer with sketch.
b) What is the function of wear ring fitted in a centrifugal pump. [6+4=10]
17. a) Sketch and describe the function and construction of shell and tube type heat exchanger and explain the terms single, two pass? State the materials used
b) Mention the type of heat exchangers used for the following:
i) Fuel oil heater, ii) Fresh water cooler, iii) Steam condenser and iv) ME Jacket cooling water heater. [7 +3=10]
18. a) With the aid of simple sketch describe the operation of plate type fresh water generator. What will be maximum salt PPM of generated fresh water?
b) Explain the term "soft scale" and "hard scale" related to scaling of FWG. How to minimize scale formation inside FWG while in operation? [7+3=10]
19. a) Draw a line diagram of two stage air compressor and why intercoolers / after-coolers are used?
b) What will be the reason for following faults in a multistage air compressor?

- i) First stage discharge pressure low
- ii) Relief valve of second stage is lifting

[7+3=10]

20. a) Describe the followings with respect to conventional purifiers with the help of a simple sketch? (Only diagram needed)

- i) Bowl assembly, ii) dirty oil inlet, iii) clean oil outlet and iv) disk stack.

What is the function of a gravity disc fitted at conventional purifier?

b) Explain why centrifugal separation is a preferred option than gravity separation on board? [7+3=10]

21. a) Explain the manual starting procedure of a conventional purifier with all the precautions?

b) What are function of WMS and SMS fitted at ALCAP type purifier? Describe in brief. [6+4=10]

22. a) Sketch and level the general arrangement of a Windlass with mooring rope drum. State functions and roles of each part of anchor windlass on ship.

b) What are windlass Safety Devices? [7+3=10]
