

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2023
Programme Name: Semester: B.TECH(ME)
Semester: V Subject Code: UG11T4503
Subject Name: MARINE AUXILIARY SYSTEMS AND DECK
MACHINERY

Date: 07.12.2023

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

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

1. For pumping requirements where large capacity and smaller discharge head is required, the following pump is used
 - a. Self-priming double impeller centrifugal pump
 - b. Large piston dia reciprocating pump
 - c. Axial flow pump
 - d. Submerged deep well pump.
2. Excessive scale formation in a fresh water generator may be due to?
 - a. Poor distillate quality
 - b. Reduced evaporator capacity
 - c. Improper vacuum regulation
 - d. Low brine concentration
3. Baffles are used in a Shell and tube type heat exchanger to?
 - a. Increase the strength
 - b. Guide the flow
 - c. Absorb heat
 - d. Corrosion prevention

4. The vanes of a centrifugal pump are generally?
 - a. Forward-curved
 - b. Radial
 - c. Backward curve
 - d. Twisted
5. Intercoolers are used in air compressor?
 - a. To prevent dust to enter
 - b. To store air
 - c. To reduce temperature of air
 - d. To remove traces of moisture
6. Synthetic oil are preferred in air compressor due to?
 - a. More volatility
 - b. Lengthen air compressor life
 - c. Lower flashpoint
 - d. Easily degradable.
7. Boiler feed pumps used in modern ships are generally of?
 - a. Reciprocating pump
 - b. Heleshaw pump
 - c. Multistage centrifugal pump
 - d. Single stage centrifugal pump
8. The correct gravity disc for a purifier is selected by?
 - a. Oil analysis
 - b. Hologram
 - c. Nomogram
 - d. Running Speed of purifier
9. Fuel and water are generally separated by means of?
 - a. Settling tank
 - b. Clarifier
 - c. Purifier
 - d. Coarse filter
10. In a ship Warping drum is related to?
 - a. Oil pollution equipment
 - b. Windlass/Mooring winches
 - c. Navigation equipment
 - d. Automation

Section B

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

11. Why relief valve is fitted at positive displacement pump? What will be the set lifting pressure value of that?
12. Explain how a fresh water generator capacity can gradually reduce during a long sailing. What will be the remedy?
13. Explain why unloaders are fitted at inter cooler and after coolers of an air compressors?
14. Explain the difference between purifying and clarifying?
15. What is Slipping Clutch in 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]
