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

**End Semester Examinations – December 2025**

**Programme Name: B Tech (ME)**

**Semester: V**

**Subject Code: UG11T4503**

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

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Date: 10.12.2025	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

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General Instructions

**All Sections (A, B & C) are to be attempted.**

**Section A**

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. When buying a water pump, what is the most important point you must consider:-
    - A. Price & Flow quantity of the pump
    - B. Durability & Availability of the pump
    - C. Serviceability & Spare part availability of the pump.
    - D. Flow quantity & Head of the pump
  2. NPSH in the context of a pump refers to:
    - A. New pump suction head
    - B. New priming suction head
    - C. Net positive suction head
    - D. None of the above.
  3. Fresh water generator on board ship should not be run when vessel playing
    - A. Coastal waters at reduced speed
    - B. Deep seas at full speed
    - C. In cold sea water conditions
    - D. None of the above
  4. Rubber gasket are used in a plate type heat exchanger to?
    - A. Increase the strength
    - B. Guide both fluid and maintain sealing.
    - C. Absorb heat
    - D. Proper sealing
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5. Cooling is required in multistage air compressor?  
A. It increases volumetric efficiency.  
B. To store air  
C. To prevent leakages  
D. To remove traces of moisture only.
6. Drain / Unloader valve used in air compressor for?  
A. Removing dirt particles in air  
B. Lengthen air compressor life  
C. Removing moisture  
D. Increasing efficiency
7. Which of the following does not influence filtration/ purification?  
A. Temperature  
B. Density  
C. Viscosity  
D. Ph
8. For a purifier, to find out correct size of gravity disk the following is used  
A. Viscosity graph  
B. Nomogram  
C. Histogram  
D. Thermogram
9. The revolving drum of a windlass which is used to handle mooring lines is called?  
A. Warping drum or mooring drum  
B. Lines drum  
C. Dog clutch  
D. Gypsy
10. Chain stopper / Guillotine stopper  
a. Hold the chain in tension.  
B. Load off the windlass when anchor is secured.  
C. Provide strength to windlass.  
D. Provide strength to anchor chain.

**Section B**

**All Five Questions to be answered**

5x2=10

11. How heat exchangers are classified according to flow and pass?  
12. What are the advantages of multi stage compression?  
13. What is the purpose of wear rings in a centrifugal pump?  
14. Explain why the use of centrifugal separation is much faster and more effective than gravity in the separation process  
15. List out various materials used in reciprocating air compressor parts.
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**Section C**

**Any 05 questions to be answered.**

5x10=50

16. A] centrifugal sea water pump is to be retrofitted in the engine room for additional coolers. As there is no room on the ER bottom platform, this needs to be installed above water line. What problems we may encounter? (4)
- B] What could be the different methods to encounter these problems? (6)

17. With reference to pumping system on board (marine application):-
- A) Explain the effects of vapour pressure in pumping operation.
- B) Effect of viscosity in pumping operation.
- C) Explain the necessity of relief valve fitted on positive displacement pump.

(3+3+4)

18. A) Sketch and describe a two pass shell and tube type (with baffles) heat exchanger.
- B) List out the advantage and disadvantage of shell and tube type and plate type heat exchanger. (7+3)

19. A) Why does water produced by a fresh water generator require treatment prior to human consumption? How is it made suitable?
- B) Discuss how scales are formed in the evaporator section of a shell and tube type fresh water generator. Discuss measures for minimizing and for removal of these scales? (5+5)

20. A) Draw a cross sectional view of a conventional purifier bowl assembly showing various parts.
- B) List out the alarms for the safe operation of a Heavy Oil purifier. (7+3)

- 21 A] Draw a single line sketch of a single crank two stage reciprocating air compressor describing path of air. (7)
- B] What could be the possible reasons for a) Oil emulsification in air compressor crankcase b) Reduced performance of air compressor (3)

22. A) Describe the operation of variable torque hydraulic system fitted for windlass operation. Sketch the control block along with motor and expansion tank.
- B) List out the key safety device related to the Windlass. (7+3)

