

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2024

Programme Name: B Sc (NS)

Semester: III

Subject Code: UG21T5303

Subject Name: Marine Engineering, Automation & Control Systems - I

Date: 11.12.2024

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. What is the function of condenser used in refrigeration system?
 - a) To convert liquid refrigerant to vapour refrigerant
 - b) To decrease the refrigeration effect.
 - c) To heat the refrigerant.
 - d) To convert vapour refrigerant to liquid refrigerant

2. Strain is defined as the ratio of
 - a) Change in volume to original volume
 - b) Change in length to original length
 - c) Change in cross-sectional area to original cross-sectional area
 - d) Any one of the above

3. An air compressor is equipped with an intercooler and an after-cooler to _____.
 - a) Inject water vapour into the compressed air
 - b) Prevent overheating of first stage valves
 - c) Increase compressor efficiency and economy
 - d) Reduce the compressed air charge density

4. Mild steel belongs to the following category
 - a) Low carbon steel
 - b) Medium carbon steel
 - c) High carbon steel
 - d) Alloy steel

5. PH value of water for drinking water.....
 - a) 6.5 to 8.5
 - b) 11 to 14
 - c) 9.5 to 11
 - d) 1 to 3.5

6. A step-up transformer has _____ number of turns on primary winding and _____ number of turns on secondary winding.
- Less, More
 - More, More
 - More, Less
 - Less, Less
7. An improperly maintained filter used in a hydraulic system can _____.
- Reduce or stop the output action of the actuator
 - Allow all metal particles to enter the power unit
 - Rupture the pump discharge piping
 - All of the above
8. In an electric steering gear system, what is the function of the control unit?
- To monitor the Hydraulic Oil Level
 - To interpret steering commands and control the motor
 - To adjust the ship's speed
 - To activate emergency lights
9. According to the SOLAS requirement, steering gear shall be capable to put the rudder from 35° on one side to 30° on the other side in _____.
- 28 minutes
 - 28 seconds
 - 28 hours
 - 45 seconds
10. Which of the below pumps require the relief valve?
- Centrifugal pumps
 - Positive displacement pumps
 - Both a) and b) are correct
 - Neither a) nor b) are correct

Section B

Answer all Questions.

(5X2 Marks = 10 Marks)

- What is the purpose of a circuit breaker and name any 3 breakers use on ship.
- Define Toughness and Hardness properties of a material.
- Explain the functions of any 04 auxiliary machineries fitted in the engine room of a ship
- Explain the purpose of boiler water treatment
- What is the purpose of back pressure regulator in a refrigeration system

Section C

Answer any 05 questions out of 07 questions. (5X10 Marks = 50 Marks)

- Draw and Describe Hydrophore Fresh Water System on board ship.
 - Describe the purpose of air receiver and explain the functions of any 04 mountings fitted on it.

(05 + 05 Marks)
- Write down the differences between Water Tube and Smoke Tube Boiler
 - Write down the functions of any 05 mountings fitted on boiler

(05 + 05 Marks)
- Explain the Principle of refrigeration.
 - Draw and explain the basic vapour compression refrigeration System.

(03 + 07 Marks)

19. a) Draw and explain the working of a centrifugal Pump
b) Explain Stress and Hook's law

(05 + 05 Marks)

20. a) Draw and explain the Navigation light circuit with indicators / alarms.
b) What are the advantages of Parallel Operation of Alternators and write a short note on Synchronizing and KW load sharing.

(05 + 05 Marks)

21. Explain the following terms:

- a) Annealing
- b) Normalizing
- c) Tempering
- d) Shear Force
- e) Fatigue failure

(2 Marks each)

22. a) Draw and explain rotary vane Steering Gear
b) Briefly explain the functions of various components use in a basic hydraulic Circuit.

(05 + 05 Marks)

