

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

Sep/Oct'25 SE

Programme Name: B Sc (NS)

Semester: III

Subject Code: UG21T5303

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

Date: 22.09.2025

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

Answer all Questions – Choose the Correct Answer

01 Mark each

1. The function of the hydraulic telemotor transmitter used in an electro-hydraulic steering gear system is to _____.

- a) Transmit the rudder angle to the bridge indicator
- b) Prevent the control linkage from striking the stops when hard over
- c) Automatically purge all entrained air from the system
- d) Send hydraulic signals to the receiving unit

2. Why is the evaporator used in refrigeration system?

- a) To absorb heat.
- b) To decrease the refrigeration effect.
- c) To reject heat.
- d) To improve C.O.P.

3. P H value of water for drinking water _____.

- a) 6 to 7
- b) 7 to 8.5
- c) 8 to 9.5
- d) 9 to 10

4. Strain is defined as the ratio of
- Change in volume to original volume
 - Change in length to original length
 - Change in cross-sectional area to original cross-sectional area
 - Any one of the above
5. 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
6. 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
7. Which type of mechanical device is used to give energy to the liquid?
- Fluid power system
 - Hydraulic system
 - Pneumatic system
 - Hydraulic Pumps
8. Mild steel belongs to the following category
- Low carbon steel
 - Medium carbon steel
 - High carbon steel
 - Alloy steel
9. An air compressor is equipped with an intercooler and an after-cooler to _____.
- Inject water vapour into the compressed air
 - Prevent overheating of first stage valves
 - Increase compressor efficiency and economy
 - Reduce the compressed air charge density
10. What is the function of safety valve in the boiler?
- To prevent excessive steam pressure
 - To prevent excessive air pressure
 - To prevent excessive water pressure
 - To prevent from rising temperatures

Section B

Answer all Questions

02 Marks each

11. Name the different methods used for generating fresh water from sea water on-board a ship.
12. What are the services to which power is supplied from the emergency generator?
13. What are the different types of pumps used on-board ship?
14. Explain Hook's Law.
15. What are the uses of ceramics?

Section C

Answer any 5 Questions

10 Marks each

16. a) Describe a compressed air plant as found on a ship. (5 Marks)
 b) Explain water tube boiler with a neat sketch. (5 Marks)
17. a) Describe a ram type steering gear. (5 Marks)
 b) Explain the necessity of cooling/heating of hydraulic oil. (5 Marks)
18. a) Define and explain Tensile, Compressive and Shear forces. (5 Marks)
 b) Explain the smelting and refining process by which steel is produced from iron ore. (5 Marks)
19. a) Explain the various methods of heat treatment of steels. (5 Marks)
 b) Draw & explain a navigation light circuit with indicators/alarms and alternate power supply. (5 Marks)
20. a) Describe a basic refrigeration compression cycle. (5 Marks)
 b) Describe a typical bilge & ballast system of a ship. (5 Marks)
21. a) List the function of various machineries/equipment in the Engine Room. (5 Marks)
 b) Describe domestic fresh water Hydrophore system. (5 Marks)
22. a) Explain the following.
 - (i) Overload Trip. (2.5 Marks)
 - (ii) Short Circuit Trip. (2.5 Marks)
 b) Explain the parallel running and load sharing of alternators/generators. (5 Marks)

