

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

**End Semester Examinations – December 2023**

**Programme Name: B.Sc (NS)**

**Semester: III**

**Subject Code: UG21T5303**

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

Date: 08.12.2023	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**

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
  - 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

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

(5x2marks=10marks)

11. Define Elasticity.

12. State the working principle transformer.

13. Name any four different types of Positive Displacement pumps used on board?

14. What is the purpose of the breaker? Name the 2 inbuilt protections in a breaker.

15. Name two different types of Steering Gears found on vessels.

### **Section C**

Answer any 5 Questions out of 7 question (5x10marks=50marks)

16 a) Explain any 5 Auxiliary Machinery installed on board (5 Marks)

b) Write a short note on requirements of production of FW on ships.  
(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) Draw the simple vapour compression cycle of refrigeration labelling all the components (5 marks)

b) Explain the principle of Refrigeration (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. Explain the following.

a) Overload Trip and Short circuit trip (5marks)

b) Parallel running and load sharing of alternators/generators.

(5 Marks)

