

Indian Maritime University
(A Central University, Govt of India)
Supplementary Examinations – March/April 2025

B Sc (NS)
Semester III
UG21T5303

Marine Engineering, Automation & Control Systems I

Date: 20.03.2025

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.
- (iii) Scientific Calculator is permitted.
- (iv) (Norrie's Table, Nautical Almanac, Hindship Hyd. Particulars, Weather coding booklet, Tide Tables, permitted as per the subject concerned)
- (v) (World Map, Tidal curve, Radar Plotting sheets, Charts, Illumination range curve chart will be supplied by the Examination Centre)

Section A

Answer all Questions (10 x 1 Marks = 10 Marks)
Choose the Correct Answer

1. 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
2. Mild steel belongs to the following category
 - a) Low carbon steel
 - b) Medium carbon steel
 - c) High carbon steel
 - d) Alloy steel
3. A step-up transformer has _____ number of turns on primary winding and _____ number of turns on secondary winding.
 - a) Less, More
 - b) More, More
 - c) More, Less
 - d) Less, Less
4. 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

5. 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
6. What is the function of safety valve in the boiler?
- To prevent excessive steam pressure
 - To prevent excessive air pressure
 - To prevent water pressure
 - To prevent from rising temperatures
7. Why is the evaporator used in refrigeration system?
- To absorb heat.
 - To decrease the refrigeration effect.
 - To reject heat.
 - To improve C.O.P.
8. Which type of mechanical device is used to give energy to the liquid?
- Fluid power system
 - Hydraulic system
 - Pneumatic system
 - Hydraulic Pumps
9. The function of the hydraulic telemotor transmitter used in an electro-hydraulic steering gear system is to _____.
- Transmit the rudder angle to the bridge indicator
 - Prevent the control linkage from striking the stops when hard over
 - Automatically purge all entrained air from the system
 - Send hydraulic signals to the receiving unit
10. 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

Section B

Answer all Questions (5 x 2 Marks = 10 Marks)

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

Section C

Answer any 5 Questions (5 x 10 Marks = 50 Marks)

16. 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)
17. 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)
18. a) Explain the following.
(i) Overload Trip.
(ii) Short Circuit Trip. (5 Marks)
b) Explain the parallel running and load sharing of alternators/generators. (5 Marks)
19. a) List the function of various machineries/equipment in the Engine Room. (5 Marks)
b) Describe domestic fresh water Hydrophore system. (5 Marks)
20. a) Describe a compressed air plant as found on a ship. (5 Marks)
b) Explain water tube boiler with a neat sketch. (5 Marks)
21. a) Describe a basic refrigeration compression cycle. (5 Marks)
b) Describe a typical bilge & ballast system of a ship. (5 Marks)
22. a) Describe a ram type steering gear. (5 Marks)
b) Explain the necessity of cooling/heating of hydraulic oil. (5 Marks)

