

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

Programme Name: B Sc (NS)

Semester: IV

Subject Code: UG21T5404

Subject Name: Marine Engineering, Automation & Control Systems II

Date: 06.06.2024

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

1. Steam Turbine Main Propulsion Engine is an Internal Combustion Engine converting Heat Energy of Steam into a Mechanical Form of Propulsion – True or False.
2. Black Water passes through the Biological STP Chambers as follows,
 - a. Aeration, Primary, Settling, Chlorination
 - b. Primary, Aeration, Settling, Chlorination
 - c. Primary, Settling, Aeration, Chlorination
 - d. Settling, Primary, Aeration, Chlorination
3. 0.1% m/m Sulphur Content in Fuel means
 - a. 0.1 gm Sulphur in a total of 100 gms of Fuel
 - b. 0.1 gm Sulphur in a total of 100 kgs of Fuel
 - c. 0.1 kg Sulphur in a total of 1000 gms of Fuel
 - d. 0.1 gm Sulphur in a total of 1000 gms of Fuel.
4. In a Moving Blade of a Reaction Turbine,
 - a. Steam Pressure drops, Velocity Increases
 - b. Steam Pressure remains constant, Velocity drops
 - c. Steam Pressure increases, Velocity drops
 - d. Steam Pressure decreases, Velocity decreases.
5. Refrigerant Gas coming out from an Evaporator is
 - a. Undercooled
 - b. Transition phase Gas to Liquid
 - c. Superheated
 - d. Transition phase Liquid to Gas

6. On a Chemical Tanker, there is a leaking Cargo side seal on the Hydraulic Oil driven Centrifugal Pump. The Cargo Leak will manifest itself in
 - a. Hydraulic Oil Tank
 - b. Purging Pipe
 - c. Inerting Pipe
 - d. Gas Freeing Vent Pipe.
7. SOLAS requires that during a Blackout, a Ship's Air Whistle shall be capable of operating
 - a. intermittently for 12 hours
 - b. intermittently for 6 hours
 - c. intermittently for 18 hours
 - d. continuously for 3 hours
8. Checking for Hydrocarbons in a Tank Atmosphere prior Man-entry, we must use
 - a. Tankscope
 - b. Explosimeter
 - c. Multi-Gas Detector
 - d. Oxygen Analyzer
9. Dead Man's Handle is used when
 - a. Duty Engineer uses it during the Unmanned period
 - b. Duty Engineer uses it to Hoist up the LifeBoat
 - c. Duty Engineer uses it to Lower the LifeBoat
 - d. Duty Engineer uses it to let Bridge Know all is well in Engine Room
10. DO Cooler in a Fuel Oil System is used to
 - a. Increase the Viscosity of Low Sulphur Fuel Oil
 - b. Increase the Viscosity of Marine Gas Oil
 - c. Reduce the Density of Low Sulphur Fuel Oil
 - d. Increase the Density of Marine Gas Oil

Section B

Five Questions of 02 Marks each

11. Describe briefly what is an Integral Action in a P+I Controller.
12. What is Volumetric Efficiency, Brake Thermal Efficiency, Maximum Continuous Rating and Propeller Efficiency?
13. Describe the difference between a Gate Valve and a Butterfly Valve.
14. What is a Rudder Drop and Jumping Clearance?
15. Describe working Cycle of a 2-Stroke and a 4-Stroke Engine.

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16. Sketch and Describe a Vapour Refrigeration System with Diagram showing how a Meat/Fish Room and Veg/Dairy Room is cooled to -18°C and $+6^{\circ}\text{C}$ respectively.

17. Describe with Diagram a) Axial type and b) Radial type Continuous Running, Unidirectional, Reversible Hydraulic Flow Pumps of Steering Gear.

18. a. What Arrangements are necessary to ensure a Safe Engineering Watch when carrying Dangerous Cargo?

b. Describe what is an UMS watch and what Checks need to be carried out before retiring for the night?

19. Sketch and Describe Inert Gas Production from Auxiliary Boiler Flue Gas on a Crude Oil Tanker.

20. a. Sketch and Describe a Schematic Diagram of a Steam Driven Turbine Cargo Oil Pump.

b. How does an Impulse Turbine work?

21. a. What is a Scavenge Fire?

b. What are its causes?

c. Explain what role does a Turbocharger play in Scavenging process.

22. State the procedures for Warming up, Starting, Manoeuvring, Reversing and Full Power Running of Main Engine.

TMM