

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

Supplementary Examinations – September/October 2024

Programme Name: B Tech (ME)

Semester: IV

Subject Code: UG11T4407

Subject Name: Automation, Control Engineering and safety Devices

Date: 09.10.2024

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

1. What is the full form of PLC ?
(A) Programmable logic computer (B) Programmable logic Controller
(C) Programme level controller (D) Programmable letter controller
2. In a final correcting element, the component responsible for accurate positioning of actuator is _____.
3. What is the full form of VFD with reference to Ship Electrical Propulsion Ship?
(a) Variable frequency drive (b) Variable force drive (c) Variable forced Diode (d) None
4. Ratio control on boiler ignition system regulates the below two elements
(A) Feed water and Steam Produced (B) Air and Fuel
(C) Heat generated and Heat utilised (D) All of the above
5. Which one of the following can be the result of introducing integral action in unity feedback system?
(A) Reduced Noise (B) Eliminate the steady state error (C) Increased stability
(D) Faster system response
6. Main Engine Over speed trip is generally set at _____ of rated speed.
7. In Sequential Starting control system, Steering Gear should be set to start at _____ Sec after power is restored.

8. What is the full form of VCB with reference to High Voltage ship?
(a) Vacuum circuit breaker (b) Vacuum case breaker (c) Vacuum closed breaker
(d) None.

9. Derivative Control is also called as ___ ___ Controller.

10. The following will act as a trip for generator engine
(A) Exhaust gas turbocharger inlet high (B) Fuel oil leakage tank high
(C) Generator sump lube oil level low (D) Over speed

Section B

11. What are the elements of basic closed loop Control system arrangement.

12. Write a short note on Alarm printer system?

13. What is HMI?

14. What is the difference between Digital and Analog Signal in automation?

15. Explain boiler feed water high salinity alarm?

Section C

16. a. What are SOLAS requirements for Unattended Machine Spaces (UMS) (8 Marks)

b. what an 'Extension alarm' on UMS ship (2 Marks)

17. Explain following functions related to Main Engine for Propulsion

- Remote control
- Local Control
- Normal values of various parameters being monitored
- Alarm and Shut down values
- explain what is "Slow down" function. (10 Marks)

18. What is the importance of Synchro Transmitter and Receiver? Where is it used on board ship? (10 marks)

19. a. Explain Simple 3 element Boiler water level control system with suitable diagram (6 Marks)

b. List various safety devices and alarms incorporated in marine boiler, explain settings/functioning of each device. (4 Marks)

20. Explain monitoring and control system of advanced boiler combustion control with detailed flowchart and diagrams (10 marks)

21. (A) Explain How viscosity of fuel oil is measured on-board? Explain with the diagram. (5 marks)

(B) How Temperature sensor is calibrated on-board? (5 marks)

22. a. Explain system configuration of a marine engine room "Data logging and Alarm monitoring system" (8 Marks)

b. What do you understand by Hysteresis (2 Marks)