

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2024
Programme Name: B Tech (ME)
Semester: VII
Subject Code: UG11T4702
Subject Name: PLC and Automation Control

Date: 12.12.2024

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 - Answer all questions

(10 x 1 = 10 Marks)

1. Which one is not an input to the auto-pilot system?
A. M/E RPM B. Ship's speed C. Rate of turn D. Turn Radius
2. Benefit of Variable Injection Timing is
A. increases peak pressure
B. increases power output of the cylinder
C. reduces the fuel consumption
D. All of the above
3. As per SOLAS, Emergency generator should start and connect to the ESB automatically within _____ seconds
A. 45 B. 46 C. 47 D. 48
4. In over current trip of power distribution system what is FLC means
A. Fuzzy Logic Control
B. Flexible Load Current
C. Full Load Current
D. Final Local Control
5. Aux boiler start /stop action is initiated by
A. Water level detector
B. Steam flow sensor
C. Steam temperature sensor

- D. Steam pressure sensor
6. Oil Mist Detector activation leads to _____
- A. Shut down of the engine B. Slow down of the engine
C. Alarm to be activated D. None of the above
7. Scattering and Fluorescence effect of light is used in the measurement of
- A. Acidity of water B. Salinity of water
C. Oil content in water D. Dissolved gases in water
8. In the control system, one controller output goes as set point to next controller is called as
- A. ON/OFF Control
B. PID control
C. Cascade control
D. Ration control
9. Isochronous governor is used in the below machine on-board.
- A. Main propulsion diesel engine.
B. Cargo oil pump turbine.
C. power generating diesel engines
D. None of the above
10. What is the primary benefit of using a PLC over traditional relay control systems?
- A. Faster network speeds
B. Lower power consumption
C. Higher data storage capacity
D. Greater flexibility and programmability

Section B - Answer all questions

(5 x 2 = 10 Marks)

11. Define Crash Manoeuvring.
12. How non-closure of bowl in the purifier is identified in monitoring system?
13. Describe how hydrophore pump function in automatic mode.
14. How Ambient temperature compensation is done for a Thermocouple?
15. What is HMI?

Section C - Answer any 5 questions

(5 x 10 = 50 Marks)

16. Describe the functioning of air run to fuel run operation of main propulsion engine with its detailed flowchart. Specify the different components used for the above operation and explain its function. -10 marks

17. Describe the following functions in generator distribution system

(A) Automatic synchronising - 4 marks

(B) Large motor start block - 3 marks

(C) Preferential trip - 3 marks

18. Draw the diagram of 3 element control system for boiler drum level control. Explain what are swell & shrink effects & how these will affect the water level control & what needs to be done to cancel their effects. (10)

19. Explain how temperature for different cold rooms are maintained in marine refer system. Draw the refer circuit used on-board to support your explanation with various components in the system. - 10 marks

20. How "Auto pilot" system works on-board? Explain this system with block-diagram. -10 marks

21. (a) With a neat Block diagram explain the components of a PLC (5)

(b) How Analog to digital convertor functions? explain with on-board application. - 5 marks

22. (a) Explain construction and working of Pneumatic Flapper Nozzle system (4)

(b) Explain PID Control including control actions of each term (6)

