

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

End Semester Examinations – June 2026

Programme Name: B Tech (ME)

Semester: 7

Subject Code: UG11T4702

Subject Name: PLC & AUTOMATION CONTROL

Date: 09.06.2026

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. In Automation, PLC stands for _____
(a) Predictive Lateral Co-ordinate (b) Programmable Logic Controller
(c) Proportional LAN Circuit (d) None of the above (a), (b) or (c)
2. Automation Systems on board ships must have _____
(a) No manual intervention at all (b) Continuous manual adjustments
(c) Manual over-ride provisions (d) None of the above (a), (b) or (c)
3. In Purifier Automation Control, partial de-sludging is _____
(a) Impossible (b) Possible (c) Unsafe (d) None of the above (a), (b) or (c)
4. On ships, Zener Diodes may be found in circuits providing _____
(a) Voltage Regulation (b) Surge Protection (c) Stable Reference Voltage
(d) All of the above (a), (b) & (c)
5. A ship's Steering Autopilot operation takes into account _____
(a) Error correction (b) Time of the day (c) Type of Main Engine in use
(d) All of the above (a), (b) & (c)
6. If Main Engine Automation is functioning properly and Turning Gear is engaged, _____
(a) Engine can be started (b) Engine cannot be started at all (c) Engine can only be started in the Astern direction (d) None of the above (a), (b) or (c)

-
7. In a ship's Main Electrical Power Distribution System, there is provision for _____ (a) Connecting Shore Supply (b) Connecting Emergency Generator Supply (c) Supplying D.C. Power (d) All of the above (a), (b), and (c)
8. Different ships may have the following types of Speed Governors _____ (a) Electronic (b) Mechanical (c) Electro-Hydraulic (d) Any of the above (a) (b) or (c)
9. Auxiliary Boiler Burner Trip takes place due to _____ (a) Flame Sensor Failure (b) Unstable Flame (c) Ignition Problems (d) All of the above
10. A Feedback Signal in a Control Loop _____ (a) Improves Accuracy (b) Lowers System Stability (c) Increases Noise & Disturbance (d) All of the above (a), (b) & (c)

Section B

Five Questions of 02 Marks each

11. What is capacity control in Air Conditioning Compressors ? (1)
Very briefly state one method of how it is achieved ? (1)
12. Which machineries/equipment is supplied power by the Emergency Generator / Switchboard in case of Main Power Failure (2)
13. Why is Boiler Water Control necessary ? (1) How is this achieved ? (1)
14. What are the Safety Controls and Alarms provided on Electro-Hydraulic Cranes on board ships ? (2)
15. What are the different types of Temperature Measuring Sensors ? (1)
Draw any one type and briefly state the measuring principle. (1)

Section C

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

16. (a) Define Proportional and Integral Actions (4)
(b) Sketch and describe a "P + I" Controller (6)
17. (a) What are the cycles in a Boiler Combustion System ? (3)
(b) Sketch & describe the Boiler Auto Combustion Control System. (4)
(c) What are the Safety Interlocks provided in this system ? (3)
-

-
18. (a) What are the requirements of Bridge Control of the Main Engine ? (3)
(b) With a Block Diagram, briefly explain Main Engine Automation. (7)
19. (a) What are the Control & Safety Devices that protect an Alternator ? (3)
(b) When some heavy load like a Crane or Deck Machinery is started, what is required to maintain a stable voltage ? Describe the system with a sketch. (7)
20. (a) Draw the Schematic Diagram of a Ship's Refrigeration System supplying three rooms (Meat/Fish, Vegetable/Dairy & Lobby), labelling it properly with all components, sensors, cut-outs, thermometers and pressure gauges (7)
(b) Give a brief description of the same (3)
21. (a) What are the components of a ship's Steering Gear System ? (5)
(b) How is the ship steered automatically on a certain specified course? (5)
22. (a) What is PLC ? (3)
(b) Draw and explain the architecture of PLC -mention the advantages and disadvantages .(4)
(c) Compare PLC & PC.(3)

----- THE END -----

