

Indian Mar@itime University
(A Central University, Govt of India)

Supplementary Examinations – March/April 2025

Programme Name: B Tech (ME)

Semester: IV

Subject Code: UG11T4407

**Subject Name: AUTOMATION, CONTROL ENGINEERING AND SAFETY
DEVICES**

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| Date: 08.04.2025 | 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.

Section A

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

1. What is the full form of RAM ?
 - A) Round around memory
 - B) Round around monitor
 - C) Reliable access memory
 - D) Random access memory

2. What will happen in case of " Flame failure alarm" in aux boiler ?
 - A) Aux boiler steam generation increased
 - B) Aux boiler feed water flow stopped
 - C) Aux boiler shut down
 - D) Aux boiler Fuel flow increased

3. What is the full form of PLC ?
 - A) Programme length controller
 - B) Programmable logic Controller
 - C) Programme level controller
 - D) Programmable letter controller

4. Which type of alarm " low water level " in boiler ?
 - A) This is a only audio visual alarm
 - B) This is a audio visual alarm as well as shut down

- C) This is not related with boiler alarm
- D) This is a purifier alarm

5. What is viscometer?

- A) This is a device that measures the viscosity and flow properties of liquids.
- B) This is a device that not measured the viscosity and flow properties of liquids
- C) This is a device that measures the force properties of liquids
- D) This is a device that measures the flow properties of solids

6. What is calibration?

- A) Calibration is the process for controlling intermolecular force.
- B) Calibration is the process of comparing a device with an unknown value to a reference standard with a known value
- C) Calibration is the process of changing set point
- D) Calibration is the process of transferring a device with an unknown value

7. Which control loop system is having " Feedback " ?

- A) Open Loop control system
- B) Open and Close loop control system
- C) Close loop control system
- D) This is not related with any control system

8. What is " Time lag " ?

- A) Time lag in process control is the increase between the time a process variable changes and the time that the control
- B) Time lag in process control is the constant between the time a process variable changes and the time that the control
- C) Time lag in process control is the delay between the time a process variable changes and the time that the control
- D) Time lag in process control is the reduce between the time a process variable changes and the time that the control

9. Which type of alarm " Low Low Lube oil Pressure " in auxiliary diesel generator?

- A) This is a audio visual alarm as well as shut down
- B) This is a audio visual alarm
- C) This is a audio visual alarm as well as shut down in boiler
- D) None of the above

10. Fill up the blanks

_____ is a device that detects and measures a physical quantity, then provides that information to the control system.

- A) Transformer
- B) Rectifier

- C) Controller
- D) Sensor

Section B

Five Questions of 02 Marks each

- 11. Explain boiler feed water high salinity alarm?
- 12. Write down any four mode of control system?
- 13. Describe the operational principle of pressure switch?
- 14. Explain ON/OFF control with any on-board application
- 15. Why the controller must be tuned?

Section C

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

- 16. What is safety device? How they work? What are the main engine shut down safety devices? (3+3+4)
- 17. Explain function and operation of an actuator? Write down types of actuators? (7+3)
- 18. Explain monitoring and control system of advanced boiler combustion control with diagram? 10
- 19. Draw and explain jacket cooling water temperature control circuit in detail. (10)
- 20. Write down
 - A) Requirements of UMS
 - B) Failure mode and effects analysis (5+5)
- 21. Explain the function of temperature switch working in the principle of bi-metallic expansion. (3 marks)
What is Log Printer? How this is helpful for on-board operations? (3 marks)
Explain the function of Extended alarm system? How any alarm sounded in this extended unit get reset? (4 marks)
- 22. Draw the diaphragm -type pneumatic operated control valve, Explain how this valve regulate the flow? (10 marks)

