Register No: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (R,S), MAY 2024

ROBOTICS AND AUTOMATION

Course Code: **21RA202**

Course Name: **Programmable Logic Control and Computer Numerical Control**

Max. Marks: **60** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Define logic controller. List its types.
2. With suitable diagram explain relay logic concept.
3. Give the comparison instructions in PLC ladder programming.
4. Differentiate between NC and CNC systems.
5. Define linear interpolator.
6. Explain canned cycle.
7. Explain the parameters involved in APT programming.
8. Mention the role of DNC software in manufacturing process.

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

9. Illustrate the working of modular synchronous logic controllers with suitable diagram. (6)

OR

10. Draw the state diagram for a non-modular logic controller specified by the levels of two binary variables A and B. When power is switched on the system is set at an initial state, from where the evolution of A and B is watched. The lock must open if A and B are operated in the following sequence: 1. First A is activated and deactivated. 2. Then B is activated and deactivated. 3. Finally, A is activated and deactivated again. If A and B are activated in the wrong sequence, the system returns to the initial state. (6)

MODULE II

11. With a neat sketch explain the PLC architecture. (6)

OR

12. Explain discrete ac input module of PLC with neat block diagram. (6)

MODULE III

13. a) Illustrate sequence logic control with suitable example. (3)

    b) Define Data handling instructions in PLC. (3)

OR

14. Explain the different types of counters in PLC with neat necessary diagrams. (6)

MODULE IV

15. a) With proper representations explain point to point systems of NC machine. (3)

    b) State the advantages of CNC systems. (3)

OR

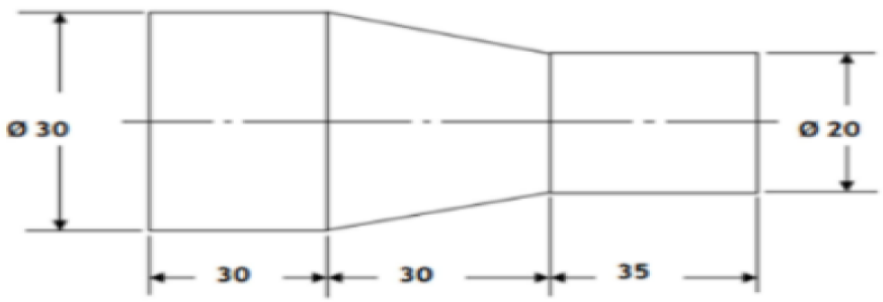
16. Describe in detail CNC incremental and absolute systems. (6)

MODULE V

17. What is the main part of the interpolator? Illustrate in detail. (6)

OR

18. Write a CNC part program using G-codes and M-codes for the given model. (6)



MODULE VI

19. Define CAD program concept in manufacturing industry. (6)

OR

20. Demonstrate with a proper block diagram the working of direct numerical control. (6)

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