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

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), JULY 2022
ROBOTICS AND AUTOMATION
(2021 Scheme)

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. Differentiate between Combinational and Sequential Logic Controllers.
2. With suitable diagram explain relay logic concept.
3. Describe a PROFIBUS.
4. State the advantages of CNC machines.
5. Explain linear interpolator.
6. Explain contour programming with a small example.
7. Recognize the parameters involved in APT programming.
8. Explain the application of Direct Numerical Control in process industry.

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

MODULE I

9. It is desired to move a cart C between points A and B which are indicated by two micro switches M_1 and M_2. The cart must be controlled by two push buttons P_1 and P_2. It is initially parked at A and remains there until P_1 is pressed. At this time output Z_1 is activated, the cart motor is switched on and the cart starts moving towards B. This movement continues even if P_1 and P_2 are pressed. When the cart reaches point B it triggers micro switch M_2 which in turn activates variable Z_2 and (6) deactivates variable Z_1, thus causing the cart to return to point A. If during this movement we press P_2, the cart should reverse direction, i.e. move again towards B. Consequently Z_1 must be activated and Z_2 deactivated again. If, on the other hand, P_2 is not pressed the cart continues towards A and it stops when micro switch M_1 is operated. Draw the flow chart of this logic controller.

OR

10. With suitable diagram illustrate the working of modular synchronous logic controllers. (6)

MODULE II

11. Illustrate the function of input module in PLC. (6)

OR

12. a) State the differences of PLC with relay logic. (3)
   b) Implement a program which executes expression a' b' + a c' (3)

MODULE III

13. Explain different types of counters available in PLC with neat schematic. (6)

OR

14. a) Define comparison instructions in PLC ladder programming. (3)
   b) Explain IEC-1133-3 standard. (3)

MODULE IV

15. a) With proper representations explain point to point systems of NC machine. (3)
   b) Explain the features of NC machine tools. (3)

OR

16. a) With neat schematic illustrate the basic functions of CNC machine. (3)
   b) Describe in detail CNC incremental and absolute systems. (3)

MODULE V

17. Explain CNC software interpolator with flow chart. (6)

OR

18. With neat sketch, explain control loops in CNC. (6)

MODULE VI

19. Explain cutter motion definitions with suitable example. (6)

OR

20. Describe the function of distributive numerical control in industry. (6)

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