

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023**(2020 SCHEME)****Course Code : 20RBT282****Course Name: Introduction to Industrial Automation****Max. Marks : 100****Duration: 3 Hours****PART A*****(Answer all questions. Each question carries 3 marks)***

1. Identify group technology and cellular manufacturing.
2. Compare fixed and flexible automation systems.
3. List the advantages of pneumatic actuators over its hydraulic counterpart.
4. Describe the necessity for sensors to be calibrated.
5. Explain the carousel type of storage system.
6. Brief adaptive control systems.
7. Explain the different actuation mechanisms in Direction Control Valves.
8. Draw the ladder diagram for AND, OR and NOR logics.
9. Write a short note on Machine Vision Systems.
10. Summarize the significance of internal relays in PLC.

PART B***(Answer one full question from each module, each question carries 14 marks)*****MODULE I**

11. a) Explain group technology. Classify the different types of grouping technologies used in the manufacturing industry. (8)
b) With neat sketch, describe different types of automated transfer lines used in an industry. (6)

OR

12. a) Differentiate the types of Flexible Manufacturing Systems layouts. (7)
b) Outline the basic design blocks of a computer integrated manufacturing system. (7)

MODULE II

13. a) Illustrate the operation of a hydraulic actuator system using a neat diagram. (6)
b) Differentiate between an incremental type and absolute type optical encoder. (8)

OR

14. a) With neat sketches explain the working of LVDT and RVDT. (8)
b) Outline the working of an inductive type proximity sensor. (6)

MODULE III

15. a) Describe any three technologies used in automated guided vehicles systems in industries. (6)
b) Explain the working of an AC servo motor with relevant diagrams. (8)

OR

16. a) Explain the adaptive control technology used in automatic machine tool changer in a CNC machine. (8)
b) With neat sketches compare any three types of conveyors used in industry. (6)

MODULE IV

17. a) Design a pneumatic circuit for A+B+B-A- sequencing operation using cascade method. (8)
b) With neat sketch explain basic components of a pneumatic system. (6)

OR

18. a) With neat sketch compare any 3 types of pressure relief valves. (6)
b) Draw and explain the basic electrical devices used in Electro Pneumatic Control. (8)

MODULE V

19. a) Explain the scanning laser optical measurement system with suitable schematic diagram. (7)
b) Design PLC ladder logic for operating two cylinders in the sequence A+B+A-B-. (7)

OR

20. a) Briefly explain coordinate measuring machine. (7)
b) Develop a PLC ladder program to glow three lights in sequence with a delay of 10 seconds in between. Once all the switches are on make sure to switch off all the lights 180 seconds after the third light is on. The circuit has only one switch to control the sequence. (7)
