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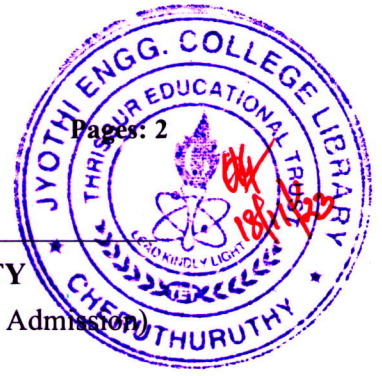
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Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech (Minor) Degree Examination June 2023 (2021 Admission)



Course Code: RAT282

**Course Name: INTRODUCTION TO INDUSTRIAL
AUTOMATION**

Max. Marks: 100

Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

Marks

- | | | |
|----|--|---|
| 1 | Define group technology and list any four advantages of group technology. | 3 |
| 2 | List any six reasons for adopting automation in industry. | 3 |
| 3 | Explain any three factors for selecting sensor. | 3 |
| 4 | Give any three differences between Resistance Temperature Detector (RTD) sensor and Thermistor sensor. | 3 |
| 5 | List any six advantages of material handling system. | 3 |
| 6 | What are machine tool guideways and state any two factors considered for designing guideways. | 3 |
| 7 | List three types of control valves and state their application. | 3 |
| 8 | Draw the ISO symbol for each: 4/2 direction control valve, 3/2 direction control valve, 2/2 direction control valve. | 3 |
| 9 | List any three advantages of PLC over electromechanical relay control. | 3 |
| 10 | List any three applications of machine vision system. | 3 |

PART B

(Answer one full question from each module, each question carries 14 marks)

Module - I

- | | | |
|----|---|--------|
| 11 | a) Explain the following with features:
(i) Programmable automation
(ii) Fixed automation | 4
4 |
| | b) With the help of neat sketch, describe the types of automated flow lines used in an industry. | 6 |
| 12 | a) Define Cellular Manufacturing. List any four objectives of cellular manufacturing. Discuss composite part concept. | 6 |
| | b) Explain different types of flexible manufacturing system. | 8 |

Module -2

- 13 a) With the help of neat sketch, explain principle and working of LVDT. 6
b) Illustrate the working of strain gauge and list its any two advantages. 8
- 14 a) Explain construction and working of linear potentiometer with a neat sketch. 6
b) With neat sketch explain capacitive type of sensor and also state its applications. 8

Module -3

- 15 a) With a neat sketch, explain automated tool changer system. 6
b) With a neat sketch, explain the working of any one type of stepper motor. 8
- 16 a) Explain any three factors considered while designing material handling equipment. 6
b) State five major categories of material handling equipment used in industry and explain types of industrial trucks used in material handling. 8

Module -4

- 17 a) With neat sketch explain basic components of a pneumatic system. 6
b) What are the functions of direction control valve. Explain any one type of direction control valve with figure. 8
- 18 a) With a neat sketch timer delay circuits in electro pneumatic circuits. 6
b) Design a pneumatic circuit for A+B+ B-A- sequencing operation using Cascade method. 8

Module -5

- 19 a) With a neat sketch explain basic components of PLC. 7
b) Differentiate on line and off line inspection 7
- 20 a) Construct truth table for AND, OR, NOR and NAND gate. Design ladder logic diagram for each of them. 8
b) With neat sketch explain basic function of machine vision system. 6
