MASTER OF VOCATION
Robotics and Automation
Subject: Automation System Design
Subject Code: RA-902
Semester: Third
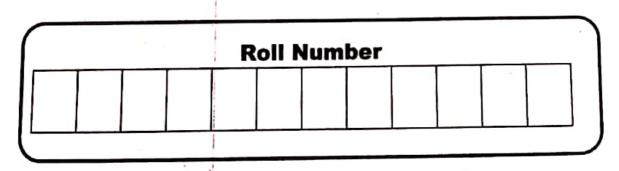**January 2021**
Theory (External): 35 Marks
Time: 03 Hours

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.

2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.

3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 marks.

4. Read the questions carefully and write the answers in the answer sheets provided.

5. Do not write anything on the question paper.

6. Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number

SECTION –A (SHORT/OBJECTIVE TYPE QUESTIONS)
(10x1=10 Marks)

A Define the solenoid valve.

B Write Classification of Automated assembly systems Based on the type of physical congregation?

C Define automation ?

D What is automated assembly line.

E Define the term BLOCKING in transfer line.

F Give Common reasons (at least three) for downtime on an Automated Production line.

G Give the benefits (at least three) of CIM over conventional manufacturing systems.

H Define term PARTIAL AUTOMATION.

I Which of the following system has feedback system?
a) Open loop system b) Closed loop system
c) Direct loop system d) None of the above

J The scientific principle that makes hydraulic systems possible is
a) Pascal's principle b) Boyle's law
c) Bernoulli's principle d) The fluid flow principle

SECTION –B (ESSAY TYPE QUESTIONS)
(5x5=25 Marks)

1. i. Define types of automation.
   ii. What kind of automation would you recommend for manufacturing?
      a) Light bulbs,
      b) Garments,
      c) Textile,
      d) Cement,
      e) Printing,
      f) Pharmaceuticals
      g) Toys

2. Write a short note on drive systems for CNC machine tools.

3. Analysis the transfer line with storage buffers. Also define the effectiveness of storage buffer.

4. A 30 station Transfer line is being proposed to machine a certain component currently produced by conventional methods. The proposal received from the machine tool builder states that the line will operate at a production rate of 100 pc / hr at 100% efficiency. From a similar transfer line it is estimated that breakdowns of all types will occur at a frequency of $F = 0.20$ breakdowns per cycle & that the average downtime per line stop will be 8.0 minutes. The starting blank that is machined on the line costs Rs. 5.00 per part. The line operates at a cost for 100 parts each & the average cost per tool = Rs. 20 per cutting edge. Compute the following: 1. Production rate 2. Line efficiency 3. Cost per unit piece produced on the line. 5

5. Describe the upper bound approach for analysis of transfer line.

6. Write the rules for product design for automation. Explain procedure for high speed feeding and orientation.

7. Explain the various types of Automated assembly systems Based on the type of work transfer system

8. Classify the hydraulic pumps. Explain one of them with constructional details.

*****END OF THE PAPER*****