

B.E. Mechanical Engineering (Model Curriculum) Semester - VII  
**PCC-ME401 - Automation in Manufacturing**

P. Pages : 2

Time : Three Hours



**GUG/S/23/14262**

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answers wherever necessary with the help of neat sketches.
  5. Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, Q. 7 or Q. 8, Q. 9 or Q. 10.

1. a) What is Automation in Manufacturing? Explain fix, Programmable and flexible automation with advantages and suitable example. 8
- b) A ten station automatic assembly system has an ideal cycle time of 20 seconds. Downtime is caused by defective parts jamming at an individual station. The average downtime per Occurrence is 2.5min. The fraction defect rate is 0.9% and the probability that the defective part will jam at a given station is 0.65 for all stations. The cost to operate the assembly machine is Rs. 130/ hour. The cost of components being assembled is Rs. 50 per unit assembly. Ignore other costs. 8
- i) Determine the yield of assembly machine.
  - ii) Determine the average production rate of good assemblies.
  - iii) What proportion of assemblies will have at least one defective component
  - iv) Determine the unit cost of assembled product.

**OR**

2. a) What is Assembly line? Give its detailed classification. Explain part delivery system used in Automated Assembly system. 8
- b) Describe various methods of work transport in detail. Explain why buffer storage is used in flow line automation. 8
3. a) Define Numerical Control. What are its components? Explain various types of NC system. 8
- b) Explain the following. 8
- i) NC words
  - ii) NC Tape formats.

**OR**

4. a) State the merits of Numerical Control. Explain with neat sketch NC coordinate system. 8
- b) Explain in detail. 8
- i) CNC
  - ii) DNC
5. a) Define Industrial Robot. Explain various types of joints used in robot. 8
- b) Describe any four robot configurations. 8

**OR**

6. a) What is FMS? What are its benefits? Explain any three components of FMS. **8**
- b) What is CAPP? Explain retrieval CAPP system in detail. **8**
7. a) What is material handling? Classify material handling equipment mentioning advantage and disadvantages of each. **8**
- b) What is AGV? Explain types of AGV. Explain Wired navigation. **8**

**OR**

8. a) What is AS/RS? Describe various types of AS/RS. What are its applications? **8**
- b) Explain Carousel storage system with neat sketch. **8**
9. a) What is Group Technology? What are the problems in implementing GT? How to identify part families. **8**
- b) Explain following for Group Technology i) Composite part concept ii) Benefits of GT. **8**

**OR**

10. a) What do you mean by Low cost automation? Explain hydraulic and pneumatic system. **8**
- b) Explain mechanical and electromechanical system in detail. **8**

\*\*\*\*\*