

B.E. Mechanical Engineering (Model Curriculum) Semester-VII
PCC-ME-401 - Automation in Manufacturing

P. Pages : 2

Time : Three Hours



GUG/W/23/14262

Max. Marks : 80

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- Notes :
1. All questions carry marks as indicated.
 2. Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q7 or Q.8, Q9 or Q.10.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.
 5. Due credit will be given to neatness.

1. a) Define Automation in Manufacturing? Explain its types with advantages and suitable example. 8
- b) Describe various methods of work transport in detail. Explain why buffer storage is used in flow line automation. 8

OR

2. a) What are the various methods of assembly line balancing? Explain any one method with 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.

3. a) Define Numerical Control. What are its components? Explain various types of NC system. 8
- b) Explain the following. 8
 - i) NC Tape formats
 - ii) NC words.

OR

4. a) Describe different method of NC part programming. What is APT? Explain various statements used in APT with suitable examples. 8
- b) Explain in detail 8
 - i) CNC
 - ii) DNC

5. a) Discuss the importance of Robot control system. Explain the categories of robot controllers. **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) State the objective of Material handling. Classify material handling equipment mentioning advantage and disadvantages of each. **8**
- b) What is AGV? Explain types of AGV. Explain Guide tape 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 **8**
- i) Benefits of GT
 - ii) Composite part concept.

OR

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