B.E.(with Credits)-Regular-Semester 2012-Mechanical Engineering Sem VII

ME - Automation in Production

P. Pages : 2 **GUG/W/16/6619**

Time : Three Hours * 4 6 5 8 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Answer questions 1 or 2, 3 or 4, 5 or 6, 7 or 8 and 9 or 10.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Illustrate your answers wherever necessary with the help of neat sketches.
6. Use of non programmable calculator is allowed.

1. a) What are the various types of Automation in Production? Explain each. **8**

b) A transfer machine has seven stations as follows. **8**

Station	Pi	Process Time (min)
1	0	0.75
2	0.02	1.20
3	0.04	1.15
4	0.05	1.45
5	0.03	1.25
6	0.01	0.95
7	0	0.60

The time to transfer between stations is 0.45 min. If the part stops due to a jam, it is removed as defective. It takes an average of 6 min to determine the fault and correct the problem and remove the part. Also, there is a scheduled tool change every 40 parts which takes 3 min to complete. There are 20000 parts to be started on to the machine.

i) How many defective parts will be removed from the line?
ii) How many total hours will be consumed in the manufacturing process?
iii) Find the proportion of downtime.
iv) Find the rate of production of acceptable parts.

OR

2. a) Give the classification of assembly systems and explain the principles to be considered while designing the product so as to make it possible to assemble it on Automated assembly system. **8**

b) A ten station automatic assembly system has an ideal cycle time of 20 seconds. Downtime is caused' by defective parts jamming at the individual station. The average downtime per occurrence is 2.5 min. 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 station. The cost to operate the assembly machine is Rs. 130 per hour and the cost of components being assembled is Rs. 50 per unit assembly. Ignore other costs. **8**

i) Determine the yield of the 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) What is Numerical control? Explain different types of NC systems. **8**

b) Explain the following for Numerical control- **8**
   i) NC words
   ii) Computer Numerical Control

OR

4. a) What is APT? Explain various statements used in APT. Give suitable examples. **8**

b) Explain Adaptive control in detail. **8**

5. a) Define 'Robot'. Describe the methods of Robot Programming. **6**

b) What is FMS? Explain its various layout configuration. **6**

c) Describe briefly the different sensors used in Robot. **4**

OR

6. a) What is CAPP? Explain different CAPP system also state its benefits. **8**

b) Explain various data files and system reports of FMS. **8**

7. a) Define AGVs. Explain the following for AGVs – **8**
   i) Traffic Control and Safety.
   ii) System management.

b) Write notes on the following – **8**
   i) Special features of AS/RS.
   ii) AGVs applications.

OR

8. a) What is AS/RS? Explain its various components. **8**

b) Explain – **8**
   i) Vehicle guidance of AGVs.
   ii) Types of AS/RS

9. a) Define 'Group Technology'. What are its advantages? Explain. **8**

b) Describe Machine Vision System along with its application. **8**

OR

10. Write notes on the following –

a) Composite Part Concept **4**

b) Off-line and On-line inspection **6**

c) CMM construction. **6**

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