B.E. (Mechanical Engineering) Eighth Semester (C.B.S.)

Automation in Production

P. Pages : 3 **NRJ/KW/17/4732**

Time : Three Hours * 0 1 6 9 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Discuss various strategies of automation. **6**

b) In the operation of a certain 15-station transfer line, the ideal cycle time is 0.58 min Break down occur at a rate of once every 20 cycles and the average down time per breakdown is 9.2 min. **7**
The transfer line is located in a plant that works an 8 hr day, 5 days per week,
Determine
a) Line efficiency

b) How many parts will the transfer line produce in a week.

OR

2. a) Name some of the important performance measures of an automated assembly system. **3**

b) List manual line balancing algorithms. (at least three) **3**

c) An eight station assembly machine has an ideal cycle time of 6 sec. The fraction defect rate at each of the eight station is 0.015 and assume that defects never Jam the workstations. When a breakdown occurs it takes 1 min on an average to put system back into operation. Determine the production rate of the assembly machine, and the yield of good product and proportion uptime of the system. **7**

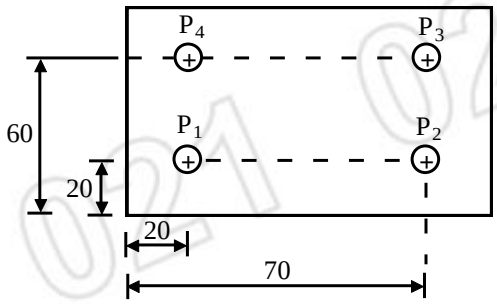
3. a) What is NC and DNC, explain. **6**

b) What are advantages and disadvantages of implementing NC technology. **7**

OR

4. a) Discuss about tape formats used in NC. **6**

b) Write the complete APT part program to perform drilling operations for the part drawing, shown below, cutting speed = 0.4 m/s feed = 0.1 mm/rev, and table travel speed between holes = 500mm/min post processor statement is MACHIN/DRILL, 04 Depth of plate is 10mm. **7**



5. a) What is an end effector in robot and what are its type. **6**

b) Explain various robot configurations with their advantages. **8**

OR

6. a) Write short notes on **any three.** **14**

a) Sensors in Robots

b) Robot programming

c) Robot Joints

d) Degree of freedom

e) Robot application

7. a) What is Automated storage and retrieval system (ASRS). Discuss with neat sketch. **6**

b) The length of the storage aisle in an AS/RS is 72 m and its height is 18 m. Suppose horizontal and vertical speeds are 120 m/min and 18 m/min respectively. S/R machine require 18 sec to accomplish a pickup and deposit operation. **8**
Find:-

a) Single and dual command cycle time/aisle

b) Throughput for the aisle under the assumption that storage system utilization is 85% and number of single command and dual command cycles are equal.

OR

8. a) What is automated guided vehicle system (AGVS) and what is forward sensing in AGVS term. **8**

b) An automated guided vehicle system has an average travel distance per delivery of 200 m and an average empty travel distance of 150 m. Load and unload times are 24 sec each. The speed of AGV is 1m /sec. Assume traffic factor to be 0.9 and availability as 0.95 **6**
Find
a) How many vehicles are needed to satisfy a delivery requirement of 30 del/hr.

9. a) Discuss distributed inspection and final inspection. **6**

b) What is group technology and what are its benefit. **7**

OR

10. a) Write a short note on "Machine Vision". **6**

b) Classify Coordinate measuring machine" with neat sketches. **7**

11. a) What are the basic components of flexible manufacturing system (FMS). Explain different FMS layouts. **7**

b) Write a short note on computer integrated manufacturing (CIM) **6**

OR

12. Write short notes on **any three** **13**

a) FMS benefits

b) CAPP

c) Manufacturing planning & control

d) CAPP benefits

e) Cellular manufacturing

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