

B.E. (Mechanical Engineering) Eighth Semester (C.B.S.)
Automation in Production

P. Pages : 3

Time : Three Hours



TKN/KS/16/7679

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) Define automation. Compare various types of automation with respect to their suitability. **6**
- b) An eight station rotary indexing m/c operates with an ideal cycle time of 20 sec. The frequency of line stop occurrence is 0.06 stop/cycle on the average. When stop occurs it takes an average of 3 min to make repair. Determine the following. **7**
- i) Average production time and average production rate
 - ii) Line efficiency
 - iii) Proportion of downtime

OR

2. a) Explain upper bound approach and lower bound approach for the analysis of transfer line. **6**
- b) A project is as shown in table below on a single model assembly line. The line is to be balanced for an annual demand of 1,00,000 units per year. The line operates 50 weeks/yr, 5 shifts/week and 7.5hr/shift. Manning level will be one worker per station. Previous experience suggest that uptime η for line will be 96% and repositioning time lost per cycle will be 0.08 min. **7**
- Determine
- a) T_{WC} - total work content time
 - b) R_P - hourly required production rate to achieve annual demand
 - c) T_C - cycle time
 - d) Theoretical minimum number of workers required on the line.
 - e) Service time T_S to which line must be balanced.
 - f) Draw the network diagram.

Table – 1

No.	Tek(min)	Must be Preceded By
1	0.2	-
2	0.4	-
3	0.7	1
4	0.1	1,2
5	0.3	2
6	0.11	3

7	0.32	3
8	0.6	3,4
9	0.27	6,7,8
10	0.38	5,8
11	0.5	9,10
12	0.12	11

3. a) Discuss the position and motion control in an NC system. 6
- b) Write APT program for the following job as shown in fig.1. 7

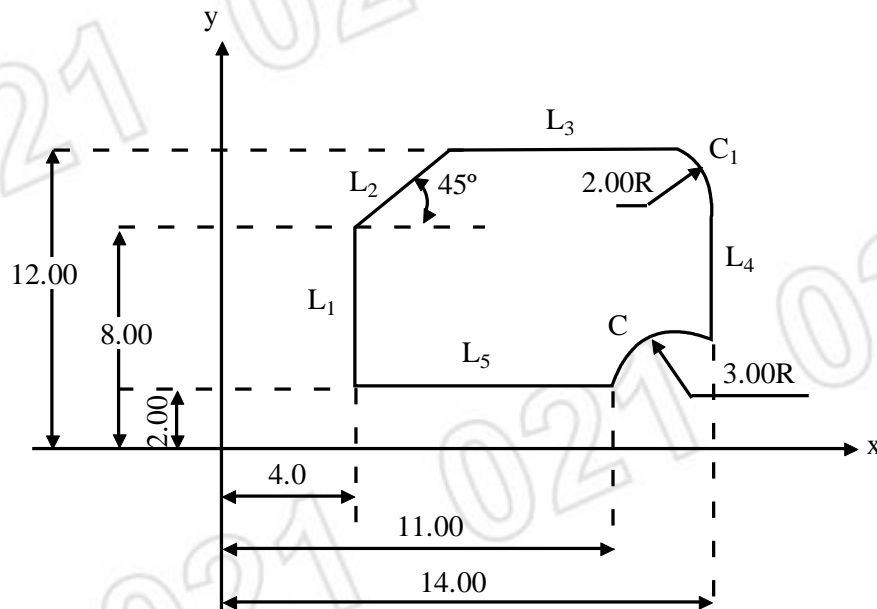


Fig. 1

OR

4. a) 'NC is suitable for all production situations', Comment. 6
- b) Explain DNC system with block diagram. State its advantages and disadvantages. 7
5. a) With the help of line sketches explain the various robot configurations. 7
- b) Explain following term in Robotics. 7
- 1) Work volume
 - 2) Control Resolution
 - 3) Degree of freedom

OR

6. a) Explain various industrial applications of robots. 7
- b) Write a short note on basic motions of Robot and Robot Joints. 7

7. a) Explain the carousel storage system and its application. 6
- b) An AGVS must be capable of taking 45 deliveries per hour. The system specifications are as follows: 7
- i) Vehicle speed = 40m/min
 - ii) Avg distance travelling per delivery under load = 105m
 - iii) Avg distance travelling per delivery under empty condition = 85m
 - iv) Pickup time = 0.70 min
 - v) Drop off time = 0.50 min
 - vi) Traffic factor = 0.90
- Determine number of vehicles required to satisfy delivery demand and handling system efficiency.

OR

8. a) What is AGV ? Explain different functions required to be performed to operate & control AVG? 6
- b) Draw neat sketch of any material handling equipment used in industry explain its working. 7
9. a) Discuss machine vision with neat sketch ? 6
- b) What are the types of automated inspection ? Explain 100% inspection system. 7

OR

10. a) 'GT is the best approach for all manufacturing situations' Comment. 6
- b) What do you mean by cellular manufacturing ? Explain the various types of cell designs used in cellular manufacturing. 7
11. a) What is an FMS ? Explain its different layout configurations. 7
- b) Explain computer Aided Process Planning. 7

OR

12. a) Explain the role of computer in manufacturing planning & manufacturing control. 7
- b) Write a short note on computer integrated manufacturing? 7
