

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

P. Pages : 3

Time : Three Hours



**NKT/KS/17/7594**

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) "Automation leads to global competitiveness". Critically comment. **6**
- b) Describe neatly the various functions contributing in information processing cycle in typical manufacturing firm. **7**

**OR**

2. a) Discuss with neat sketch the parts delivery system in automated assembly. **6**
- b) A dial indexing machine has eight stations that perform assembly operation to the base part. The element times g and m values for the components added are as follows : **7**

Station	Operation	Element time (sec.)	g	m
1.	Add part A	4	0.025	0.7
2.	Fasten part A	5	--	--
3.	Assemble part B	4	0.015	0.6
4.	Add part C	5	0.010	1.0
5.	Fasten part C	6	--	--
6.	Assemble part D	7	0.020	0.8
7.	Add part E	6	0.015	0.9
8.	Fasten part E	7	--	--

The indexing time for the dial table is 3.0 sec. when the jam occurs, it requires 1.75 min. to release the jam and put the machine back in operation. The cost of the component is Rs. 2.5/ component at each of the station and Rs. 3.5 for the base part. The cost to operate the machine is Rs. 90 / hr. Other costs are negligible.

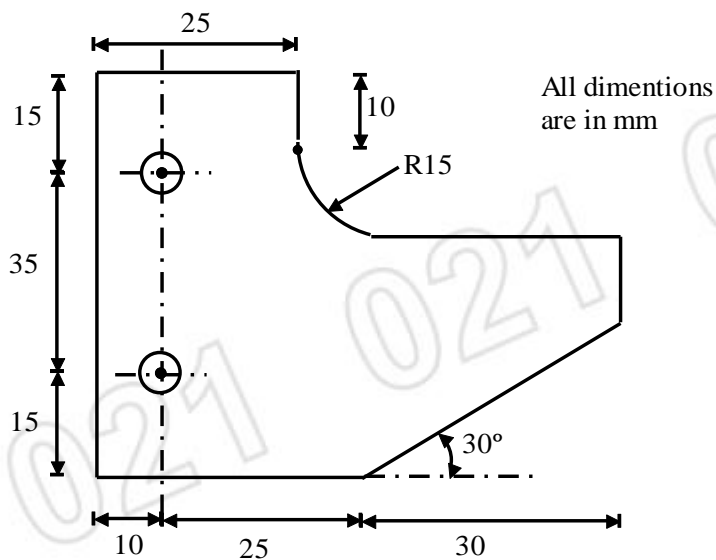
Determine :

- a) The proportion of assemblies with no defective components.
- b) The proportion of assemblies that contain at least one defect.
- c) The rate of production of acceptable product.
- d) The proportion uptime and downtime of the system.
- e) Cost per good assembly produced.

3. a) What are the basic components of Numerical Control System? Describe them in brief with neat sketch. **6**
- b) What is APT? Discuss various statements for writing the complete APT part program. Give suitable examples. **7**

**OR**

4. a) Write short note on CNC and DNC giving advantages & typical applications. **6**
- b) Prepare part program in APT for the following components if two cuts i.e. rough and finish are required alongwith two holes of 5 mm diameter. Cutter size 20 mm finish allowance 4 mm, thickness 15 mm. **7**



5. a) Explain with neat sketches the various robot configurations. **7**
- b) What is the purpose of sensors in robotic system? Discuss their types with applications. **6**

**OR**

6. a) Explain the types of robot programming. Discuss the lead through programming in brief. **7**
- b) Explain the following terms for robot **6**
- i) Degree of freedom
  - ii) Accuracy and repeatability
  - iii) Work Volume

7. a) What is an AGVS? Explain the different types of AGVS. **7**
- b) Explain the Carousel storage system and its applications. **7**

**OR**

8. a) Describe various types of conveyors used in Automatic material handling. 7
- b) An AGVS must be capable of making 40 deliveries/hour. The system specifications are as under : 7
- Vehicle velocity = 40 m/min  
Average distance travelled per delivery = 110 m.  
Pick - up time = 0.75 min  
Drop - off time = 0.5 min  
Average distance travelling empty = 75 m  
Traffic factor = 0.80
- Determine the number of vehicles required to satisfy the delivery demand. Also determine the handling system efficiency.

9. a) Define CMM? With the help of neat sketches, Explain the different configuration of CMM. 7
- b) What are the types of automated inspection? Explain 100% inspection system. 7

**OR**

10. a) Explain in brief production flow Analysis. 7
- b) 'GT is the best approach for all modern manufacturing situations', comment. 7
11. a) Discuss in brief. Computer Control in CIM. 6
- b) What is FMS? Briefly explain the FMS layout configurations giving their typical application areas. 7

**OR**

12. a) What is CAPP? Explain the retrieval and generative CAPP system in detail. 6
- b) Write short note on shop floor control. 7

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