

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

P. Pages : 2

Time : Three Hours



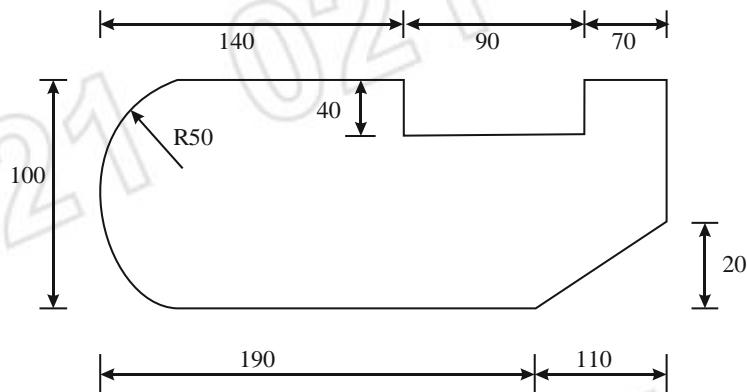
NKT/KS/17/1922

Max. Marks : 80

- Notes :
1. All questions carry equal marks as indicated.
 2. Answer **three** questions from Section A and **three** questions from Section B.
 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.

SECTION - A

1. a) Define Automation in production and explain various automation strategies. **6**
b) An 8 station automatic assembly has an ideal cycle time of 40 sec. The average downtime per occurrence is 4 min. The fraction defect rate is 1% and the probability that the defective part Jam at given station is 0.7 for all stations. The cost to operate the assembly machine is Rs. 800/- per hours and cost of components being assembled is Rs. 200/- per unit. Ignoring other cost.
Determine :
i) Yield of good assemblies
ii) 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. **7**
2. a) Explain different methods of workpart transport for transfer line. Describe their suitability to different manufacturing situation. **7**
b) Explain upper bound approach and lower bound approach for the analysis of transfer line. **6**
3. a) What is N.C. "What are its various components. Also explain how it differs from DNC. **6**
b) Write an APT program for the following component, if two cuts (rough & finish) are required. Cutter size 25 mm, finish allowance 4 mm, thickness of part 20 mm, speed 1000 rpm, feed 120 mm/min, inside Tol = 0.025 mm no outside tolerance. **7**



4. a) Explain with neat sketch various robotic configuration. **8**
b) Explain with neat sketch various robots joints. **5**

5. Write short notes on **any three**. 14
- a) DNC & CNC
 - b) Adaptive control
 - c) Work volume
 - d) End effector
 - e) Sensors in Robot

SECTION - B

6. a) What is AGVS. Explain various applications of the same. 6
- b) An AGVS must be capable of making 40 deliveries per hour. The system specifications are as follows. 7
- Vehicle speed = 60 m/min
Average loaded travel distance per delivery = 180 m
Average empty travel distance per delivery = 120 m
Pick up time = 0.60 min
Drop off time = 0.60 min
Traffic factor = 0.80
Calculate :
- i) No. of vehicles required to satisfy delivery demand
 - ii) Handling system efficiency
7. a) Define AS/RS. Explain its basic components and special features. 6
- b) A mechanized storage carousel has a length of 12 m and width of 1.5 m. The velocity of the carousel is 20 m/min. and the part handling time at the unload station is 50 sec. 7
- Determine the average time to retrieve a part from the system.
- i) Assuming that the system revolves in single direction.
 - ii) Assuming that it revolves in both directions.
8. a) What is CMM. What are its types explain with neat sketch any three. 6
- b) Explain with neat sketch machine vision system. 7
9. a) What is FMS. Explain with neat sketch various FMS layout. 7
- b) What is Group Technology. Explain production flow Analysis (PFA). 6
10. Write short notes on **any three**. 14
- a) Composite Part concept in G.T.
 - b) Opitz classification & coding.
 - c) Variant CAPP
 - d) Shop floor control.
