B.E. Eighth Semester (Mechanical Engineering) (Old)

Automation in Production

P. Pages : 2 **KNT/KW/16/2428**

Time : Three Hours * 0 2 1 0 * Max. Marks : 80

Note : 1. All questions carry 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. Illustrate your answers wherever necessary with the help of neat sketches.

SECTION – A

1. a) What is Automation. What are its type. State various reasons for automation in production system. **7**

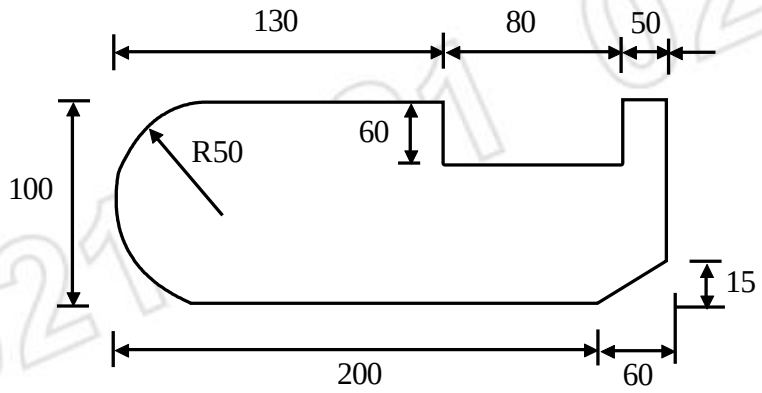
b) Explain with neat sketch information processing cycle in manufacturing. **6**

2. a) Explain upper bound approach & Lower bound approach for the analysis of transfer line. **5**

b) A 10 station transfer machine is used to produce a component. The Ideal cycle time is 1.2 min. break down occurs with a frequency of 0.12 break down/ cycle and average down time per line stop is 7.0 min. The scrap rate is 5% and starting casting for the component cost Rs 1.60 each and it will cost Rs 60/hour. to operate transfer line, cutting tool cost is Rs 0.20/workpart. Find (i) Production rate (ii) No of hours required to meet a demand of 1000 units (iii) Line efficiency (iv) Cost per unit produced. **8**

3. a) What are the basic elements of N.C system. Explain open loop and closed loop N.C system with neat sketch. **5**

b) Write a complete APT program for end milling of part shown. Cutters size 20 mm finish allowance 5 mm thickness 15 mm speed 500 rpm, feed = 100 mm/min. Inside tolerance on the circular approximation is 0.025 mm. No out side tolerance. **8**



All dim. in mm

4. a) Explain with neat sketches various robot configurations. Give suitable application of each. **8**

b) Explain various N.C Words-Elaborate each with suitable example. **5**

5. Write short Notes on **any three.** **14**

i) Methods of work part transport.

ii) N.C Tape format.

iii) Robot Joints.

iv) Adaptive control.

v) Robot end effectors.

SECTION – B

6. a) Describe the Retrieval CAPP system. What are the benefits of CAPP. **6**

b) Explain i) Vehicle guidance and Routing ii) System management with reference to AGVS. **7**

7. a) What is AS/RS . Explain various types of AS/RS. **7**

b) A mechanised 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. Determine the average time to retrieve a part from the system. **6**
i) Assuming that the system revolves in single direction.
ii) Assuming that it revolves in both directions.

8. a) Distinguish between online and offline Inspection. Also explain different sensor technologies for automated inspection. **5**

b) Describe the different configuration of coordinate measuring machine with neat sketches. **8**

9. a) What is Group technology. Explain part classification & coding system. **6**

b) What is an FMS. Explain different layout configurations of FMS. **7**

10. Write short notes on **any three.** **14**

i) Composite part concept.

ii) C.I.M

iii) Shop floor control.

iv) Machine vision system.

v) Production flow analysis.

****