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10ME61

Sixth Semester B.E. Degree Examination, Feb./Mar.2022
Computer Integrated Manufacturing

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Define Automation. Explain the different types of automation with suitable examples. **(10 Marks)**

b. What are the reasons for automation? **(04 Marks)**

c. A production machine operates 80 hr/wk(2 shifts, 5 days) at full capacity. Its production rate is 20 units/hr, during a certain week, the machine produced 1000 parts and was idle the remaining time. Determine (i) Production capacity of the machine (ii) What was the utilization of the machine (under consideration during a week). **(06 Marks)**

2 a. Explain high volume production with a suitable example. **(03 Marks)**

b. Discuss in brief the different objectives of automated flow line. **(06 Marks)**

c. Explain the following with neat sketches:
   (i) Dial indexing machine.
   (ii) Walking beam transfer bar system. **(11 Marks)**

3 a. Explain upper bound and lower bound approaches to analyze automated flow line without storage buffer. **(10 Marks)**

b. Write a short note on partial automation. **(04 Marks)**

c. The following data applies to 12 station in line transfer machine P = 0.01 (all stations have an equal probability of failure) $T_C = 0.3$ min, $T_d = 3$ min. Using upper bound and lower bound approaches compute the following:
   (i) Frequency of line stops / cycle.
   (ii) Average production rate.
   (iii) Line efficiency. **(06 Marks)**

4 a. Explain the following terms in line balancing :
   (i) Precedence diagram (ii) Balance delay. **(04 Marks)**

b. Explain the procedure to solve a line balancing problem on largest candidate method. **(06 Marks)**

c. The table below defines the precedence relationships and element times for a new project. The cycle time is 1 minute, construct the precedence diagram, find out number of work stations required and balance delay of the line using RPW (Ranked Positional Weights) method.

Work element	1	2	3	4	5	6	7	8	9	10	11	12
Time (min) t_e	0.2	0.4	0.7	0.1	0.3	0.11	0.32	0.6	0.27	0.38	0.5	0.12
Preceded by	–	–	1	1, 2	2	3	3	3, 4	6, 7, 8	5, 8	9, 10	11

(10 Marks)

PART – B

5 a. Explain in brief the principles of design for automated assembly system. **(06 Marks)**

b. What is an automated guided vehicle system and explain vehicle guidance technology for an AGVs. **(08 Marks)**

c. Explain in-line assembly machine with a neat sketch. **(06 Marks)**

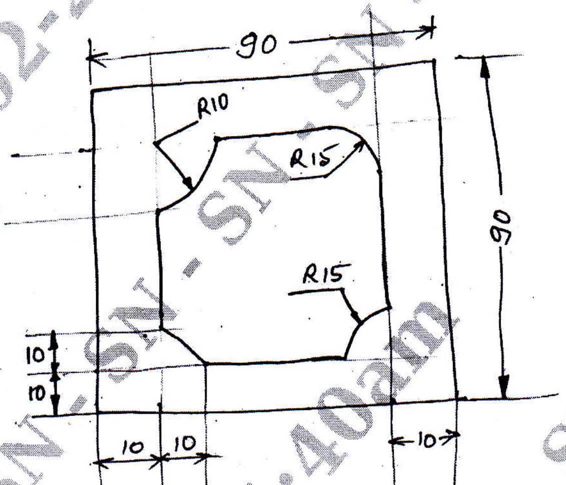
6 a. With a suitable block diagram, explain variant CAPP system. **(10 Marks)**

b. Explain the following in brief,

(i) Material requirement planning.
(ii) Capacity planning. **(10 Marks)**

7 a. Explain with a neat sketch vertical axis machining centre. **(10 Marks)**

b. Write a Mannual part program for following melting profile with a depth of unit 2 mm as shown in Fig. Q7 (b).



All dimensions are in mm

Fig. Q7 (b) **(10 Marks)**

8 a. Define a robot. Explain four physical-configurations of Industrial robot with examples. **(12 Marks)**

b. Write a short notes for the following :

(i) End effectors.
(ii) Work volume. **(08 Marks)**

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