

CBCS SCHEME

18ME72

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Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Computer Aided Design and Manufacturing

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define CAD and CAM. Briefly explain the features of Fixed automation and programmable automation. (06 Marks)
- b. Illustrate the following with mathematical models:
 - (i) Production capacity
 - (ii) Work in process
 - (iii) TIP ratio (06 Marks)
- c. A batch manufacturing plant must be processed through 7 machines. There are 30 new batches. Average operation time is 8 min. Average setup time is 2 hours and non-operations time is 4 hours. Average batch size is 15 parts. Number of workstations is 10. The plant operates for an average of 125 hours/week. Determine manufacturing lead time, plant capacity and utilization. (08 Marks)

OR

- 2 a. What are automated flow lines? With sketches, explain Inline and Rotary type of automated flow lines. (08 Marks)
- b. Describe the methods of control of an automated flow line. (06 Marks)
- c. The following data applies to a 12 station inline transfer line, $p = 0.01$ for all the stations, cycle time is 0.3 min and repair time is 3 min using upper bound approach, compute the following:
 - (i) Frequency of line stops/cycle
 - (ii) Average production rate
 - (iii) Line efficiency (06 Marks)

Module-2

- 3 a. With block diagram, explain the various steps in computer aided design process. (08 Marks)
- b. Explain the functions of a graphics package. (06 Marks)
- c. Briefly explain Translation and Scaling. (06 Marks)

OR

- 4 a. Define Computer Aided Process Planning. List its benefits. (06 Marks)
- b. With block diagram, explain variant type of CAPP system. (08 Marks)
- c. What is shop floor control? Briefly explain the various phases of shop floor control. (06 Marks)

Module-3

- 5 a. With neat sketches, explain the types of FMS layouts. (10 Marks)
- b. Explain in brief with diagram the structure of Automated Storage and Retrieval System. (05 Marks)
- c. List the advantages of Group Technology. (05 Marks)

OR

- 6 a. Illustrate the following terms with reference to Line Balancing:
 (i) Minimum rational work element
 (ii) Precedence diagram
 (iii) Balance delay (06 Marks)
- b. In a plant, a product is assembled as per the following data. Assume cycle time as 16 min:

Work element	1	2	3	4	5	6	7	8
T_e (min)	10	5	8	3	11	3	5	15
Preceded by	-	-	1, 2	2, 3	3, 4	4	5, 6, 7	

- (i) Construct precedence diagram
 (ii) Determine the number of stations required to balance the line by using LCR method.
 (iii) Determine balance delay. (14 Marks)

Module-4

- 7 a. Briefly explain the classifications of CNC system. (06 Marks)
 b. Write a note on cutter radius compensation. (06 Marks)
 c. Write the part program for the part shape shown in Fig.Q7(c). Assume suitable machining parameters.

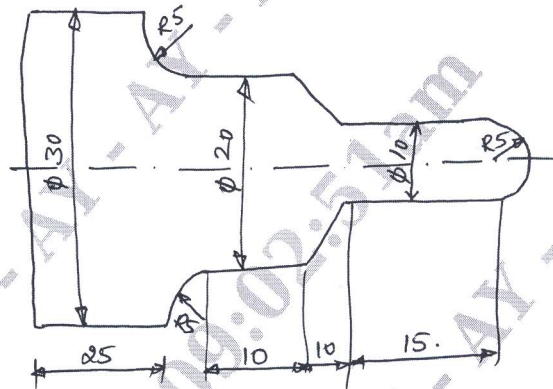


Fig.Q7(c) All dimensions are in mm

(08 Marks)

OR

- 8 a. With sketches, explain any three configurations of Industrial Robot. (12 Marks)
 b. Write a note on various sensors used in Industrial Robot. (08 Marks)

Module-5

- 9 a. With sketch, explain photopolymerization process. (10 Marks)
 b. With sketch briefly explain Fused Deposition Modeling Technique. (10 Marks)

OR

- 10 a. Briefly explain the various components of Industry 4.0. (10 Marks)
 b. Write a note on Smart Manufacturing as applied to Industry 4.0. (10 Marks)
