

CBCS SCHEME

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18ME72

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:
- Minimum rational work element
 - Precedence diagram
 - 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 |
- Construct precedence diagram
 - Determine the number of stations required to balance the line by using LCR method.
 - 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.

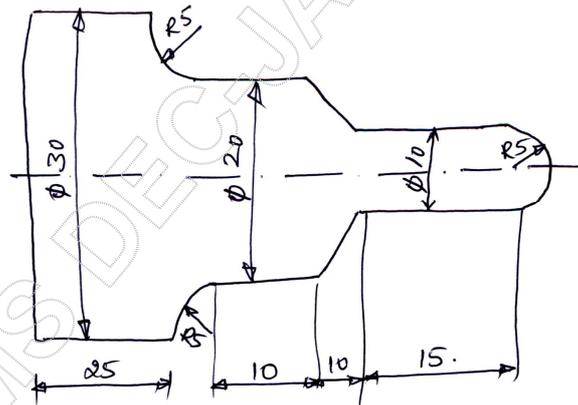


Fig.Q7(c) All dimensions are in mm

(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)
