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18ME72

Seventh Semester B.E. Degree Examination, Dec.2024/Jan.2025
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 Automation. Explain the different types of automation in brief with suitable examples. **(10 Marks)**
    b. Explain the following mathematical models:
        i)   Manufacturing lead time
        ii) Production rate
        iii) Availability
        iv) Production capacity
        v)   Utilization. **(10 Marks)**

OR

2   a. Sketch and explain walking beam mechanism. **(10 Marks)**
    b. Explain configurations of automated assembly systems. **(10 Marks)**

Module-2

3   a. Briefly discuss the basic rules to be followed in designing graphics softwares for CAD. **(10 Marks)**
    b. A square with an edge length of 10 units is located on the origin with one of the edge at an angle of 30° with positive X-axis. Calculate the new position of the square if it is rotated about Z-axis by an angle 30° in clockwise direction. **(10 Marks)**

OR

4   a. Using a block diagram or flow chart, explain the information flow in a retrieval-type CAPP system. **(10 Marks)**
    b. Explain the structure of MRP system with the help of block diagram. **(10 Marks)**

Module-3

5   a. Define flexible manufacturing system. List and explain the different types of flexibility. **(10 Marks)**
    b. Explain in brief with diagram the structure of AS/RS system. What are the advantages of it? **(10 Marks)**

OR

6 a. Explain in brief the different types of AS/RS systems. **(08 Marks)**

  b. The following data refers to the precedence relationship and element times for a new product:

Element No.	1	2	3	4	5	6	7	8	9	10	11	12
T_c (min)	0.2	0.4	0.7	0.1	0.3	0.11	0.32	0.6	0.27	0.38	0.5	0.12
Precedence	-	-	1	1, 2	2	3	3	3, 4	6, 7, 8	5, 8	9, 10	11

Using largest candidate rule method,
  i) Construct the precedence diagram
  ii) If the ideal cycle time is 1.0 min find the number of work stations required.
  iii) Balance delay and balance efficiency. **(12 Marks)**

Module-4

7 a. With a sketch explain the classification of NC/CNC's system based on motion control. **(10 Marks)**

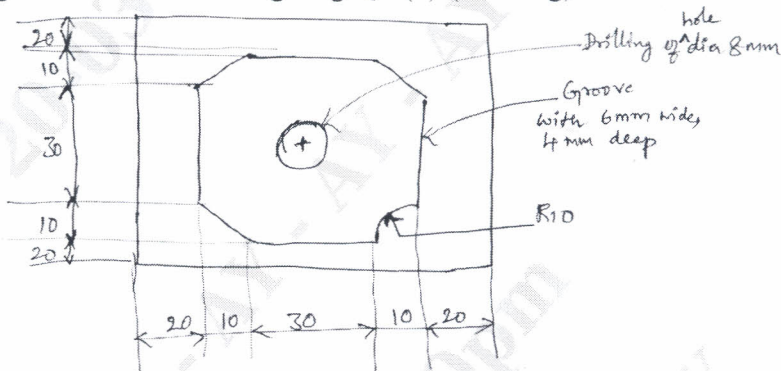 b. Write a part program for the following: Fig.Q.7(b) (drawing). Take drill diameter 8 mm.

Fig.Q.7(b)

(10 Marks)

OR

8 a. Define industrial robots. Explain the different configuration of a robot with a neat sketch. **(10 Marks)**

  b. Explain the following terminology related to robot :
  i) Accuracy
  ii) Repeatability
  iii) Resolution **(06 Marks)**

  c. Explain briefly i) Slip sensors   ii) Range sensors **(04 Marks)**

Module-5

9 a. What is "additive manufacturing"? Explain the basic principles involved in additive manufacturing. **(10 Marks)**

  b. Explain briefly the different steps involved in additive manufacturing system. **(10 Marks)**

OR

10 a. Explain the components of industry 4.0. **(10 Marks)**

  b. Write a note on internet of things. **(04 Marks)**

  c. How these AM processes are carried out:
  i) Binder jetting
  ii) Direct energy deposition. **(06 Marks)**

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