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18ME72

Seventh Semester B.E. Degree Examination, July/August 2022
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. List the reasons for Automation. (10 Marks)
- b. The average part produced in a certain batch manufacturing plant must be processed sequentially through six machines on average. 20 new batches of parts are launched each week. Average operation time is 6 minutes, Average set up time is 5Hrs, Average batch size is 25 parts and Average non-operation time per batch is 10 Hrs/machine. There are 18 machines in the plant working in parallel. Each of the machine can be set up for any type of job processed in the plant. The plant operates an average of 70 production hours per week. Scrap rate is negligible. Determine i) Manufacturing lead time for an average part
ii) Plant capacity iii) Plant utilization. (10 Marks)

OR

- 2 a. With neat sketch, explain the configuration of an automated flow line. What are the different symbols and notations practiced in production systems? (10 Marks)
- b. With neat sketch, explain Working principle of Walking beam system. (10 Marks)

Module-2

- 3 a. Briefly explain the six phases of Design process. (05 Marks)
- b. What are the component of a typical CAD system? Explain. (05 Marks)
- c. Given a square object with coordinate points A(0, 3), B(3, 3), C(3, 0) and D(0, 0). Apply the scaling parameters 2 towards X-axis and 3 towards Y-axis and obtain the new coordinates of the object. (10 Marks)

OR

- 4 a. With neat diagram, explain Generative and Retrieval CAPP System. (10 Marks)
- b. Define Material Requirement Planning (MRP) and explain its inputs and outputs. (10 Marks)

Module-3

- 5 a. Explain different components of FMS with block diagram. (10 Marks)
- b. Define Group Technology and enumerate the advantages of group technology. (10 Marks)

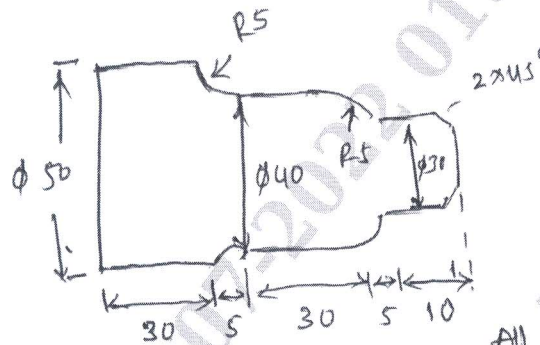
OR

- 6 a. Define the terms associated with assembly line balancing :
i) Minimum Rational work content ii) Total work content
iii) Precedence constraints iv) Cycle time v) Balance delay. (10 Marks)
- b. For the following assembly line balancing problem use largest candidate rule to find minimum number of work station required and balance delay. Take cycle time 1.0 min. Also draw precedence diagram. (10 Marks)

Work element	1	2	3	4	5	6	7	8	9	10	11	12
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
Immediate predecessor	-	-	1	1,2	2	3	3	3,4	6,7,8	5,8	9,10	11

Module-4

- 7 a. With neat block diagram, explain the components of CNC system. (05 Marks)
 b. What are G and M codes in manual part programming? Mention few G and M codes with their description. (05 Marks)
 c. Write a Manual part program for following turning job. (10 Marks)



All dimensions are in mm

OR

- 8 a. With neat sketches, explain Polar and Cartesian coordinate robotic configurations. (10 Marks)
 b. Briefly explain different types of Robot programming. (05 Marks)
 c. Briefly explain i) Control Resolution ii) Accuracy and iii) Repeatability. (05 Marks)

Module-5

- 9 a. Explain basic working principle of Additive Manufacturing. (05 Marks)
 b. Enumerate the advantages and limitations of Additive Manufacturing. (10 Marks)
 c. List the steps involved in Generic AM process. (05 Marks)

OR

- 10 a. Explain with neat sketch, the Laminated Object Manufacturing process of Additive Manufacturing. (10 Marks)
 b. With neat sketch, explain the process of Selective Laser Sintering (SLS) process. (10 Marks)
