

CBGS SCHEME

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18ME72

Seventh Semester B.E. Degree Examination, Feb./Mar. 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 different types of automation. (10 Marks)
- b. The average part produced in a certain batch manufacturing plant must be processed through an average 6 machines. 20 new batches are launched each week. Average operation time is 6 mins average set-up time is 5 hrs, average batch size is 25 parts, average non-operation time per batch is 10 hrs/machine. There are 18 machines in the plant. The plant operates an average of 70 production hours per week. Scrap rate is negligible, determine:
- (i) Manufacturing Load Time (MLT) for an average part (ii) Production rate
(iii) Plant capacity (iv) Plant utilization (v) WIP (10 Marks)

OR

- 2 a. What is buffer storage? Explain types of buffer storage with neat sketch. (08 Marks)
- b. Define Upper bound approach and lower bound approach. (04 Marks)
- c. For a 10 station transfer line, refer following data:
P = 0.01 (all stations have an equal probability of failure)
T_c = 0.5 min, T_d = 5.0 min
Using upper bound approach, determine: (i) The frequency of line stop
(ii) The average production rate (iii) The line efficiency (08 Marks)

Module-2

- 3 a. Explain with block diagram, the design process using Computer Aided Design (CAD). (10 Marks)
- b. Explain the different functions of graphics packages. (10 Marks)

OR

- 4 a. Explain in detail the Retrieval type of CAPP. (10 Marks)
- b. What is MRP? Explain the different inputs of MRP with block diagram. (10 Marks)

Module-3

- 5 a. Briefly explain different types of manufacturing cells. (10 Marks)
- b. What is AS/RS? Explain different types of AS/RS. (10 Marks)

OR

- 6 a. By using the given information:
The product demand is 1800 units/week; The industry works 48 hrs/week ;
Number of operators 8 ; Uptime of assembly is 94% ; There is no repositioning required
Determine: (i) Line efficiency (ii) Balance delay (iii) Smoothness index, by using largest candidate rule method. The work elements and their times involved in the assembly operation is as below:

Element	1	2	3	4	5	6	7	8
Tek (min)	1.0	0.5	0.8	0.3	1.2	0.2	0.5	1.5
Predecessor by	-	-	1, 2	2	3	3, 4	4	5, 6, 7

(14 Marks)

b. Define and write the mathematical model of:

- (i) Total work content time (T_{wc})
- (ii) Cycle Time (T_c)
- (iii) Smoothness Index (SI)

(06 Marks)

Module-4

- 7 a. Explain briefly the steps involved in the development of a part program. (10 Marks)
b. List out the advantages, limitations and applications of CNC's. (10 Marks)

OR

- 8 a. Explain with neat sketches the different joints used in industrial robots. (10 Marks)
b. Write a short note on robot programming methods. (10 Marks)

Module-5

- 9 a. Define additive manufacturing systems and list out its advantages, disadvantages and application. (10 Marks)
b. With neat sketch, explain sheet lamination type AM process. (10 Marks)

OR

10 Write short notes on:

- a. Evolution of industry 4.0
- b. Big data and cloud computing for IoT
- c. Supply chain optimization
- d. Cyber physical manufacturing systems

(20 Marks)
