CBCS SCHEME

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18ME72

Seventh Semester B.E. Degree Examination, June/July 2023
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. Elucidate the need for automation in production systems. Discuss the types of automation, and the reasons for automating. **(10 Marks)**

b. A certain part is produced in a batch size of 50 units and requires a sequence of eight operations in the plant. The average setup time is 3h, and the average operation time per machine is 6min. The average non operation time due to handling, delays, inspections, and so on, is 7h, compute how many days it will take to produce a batch, assuming that the plant operates on a 7h shift per day. Also find the production rate. **(06 Marks)**

c. List the computerized elements of a CIM system. **(04 Marks)**

OR

2 a. Elucidate the concept of automated flow lines, Also discuss the different system configurations of automated flow lines. **(10 Marks)**

b. A 30 station transfer line is being proposed to machine a certain component currently produced by conventional methods. The proposal received from the machine tool builder states that the line will operate at a production rate of 100 pc/hr at 100% efficiency. From a similar transfer line it is estimated that breakdowns of all types will occur at a frequency of F = 0.20 break downs per cycle and that the average downtime per line stop will be 8.0 mintues. The starting blank that is machined on the line costs Rs. 5.00 per part. The line operates at a cost for 100 parts each and average cost per tool = Rs. 20 per cutting edge. Compute the following :
i) Production rate ii) line efficiency iii) Cost per unit piece produced on the line. **(10 Marks)**

Module-2

3 a. Discuss the applications of computers in design, software configuration, function of graphics package and the geometrical construction. **(10 Marks)**

b. Elucidate the 2D transformations, translation, rotation and scaling, concept in CAD and computer graphics software. **(10 Marks)**

OR

4 a. Discuss computer Aided process planning, Retrieval and Generative systems and benefits of CAPP system. **(10 Marks)**

b. Elucidate material requirement planning and the inputs to MRP system. **(10 Marks)**

Module-3

5 a. Discuss the fundamentals of Flexible manufacturing systems, (FMS) and the types of FMS and FMS Components. **(10 Marks)**

b. Explain Automated storage/Retrieval system and Automatic parts identification systems and data capture. **(10 Marks)**

OR

6 a. A proposal has been submitted to replace a group of assembly workers. The following table gives work elements and its predecessor. Use largest candidate rule method to balance the line.

Element	1	2	3	4	5	6	7	8
T_{ek} (min)	1.0	0.5	0.8	0.3	1.2	0.2	0.5	1.5
Predecessor	-	-	1, 2	2	3	3, 4	4	5, 6, 7

The demand rate for this job is 1600 units/week at the rate of 40hrs/week

i) Construct the precedence diagram
ii) Determine the number of stations required to balance the line
iii) Determine balance delay **(10 Marks)**

b. Discuss the various methods of line balancing along with the steps involved. **(10 Marks)**

Module-4

7 a. Write a CNC program for turning the following profile as shown in the Fig Q7(a).

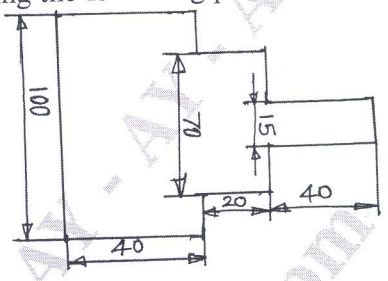

Fig Q7(a) **(10 Marks)**

b. Elucidate the following: i) Tool length compensation ii) Cutter radius compensations. **(10 Marks)**

OR

8 a. Explain Robot anatomy, joints and links, end effectors and sensors in robotics. **(10 Marks)**

b. Elucidate the common robot configurations with suitable sketches. **(10 Marks)**

Module-5

9 a. Explain the basic principles of additive manufacturing. Give its advantages and limitations. **(10 Marks)**

b. Explain photo-polymerization and binder jetting process. **(10 Marks)**

OR

10 a. Discuss the powder bed sintering techniques, and sheet lamination techniques with suitable sketches. **(10 Marks)**

b. Elucidate direct energy deposition techniques and applications of Additive manufacturing. **(10 Marks)**

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