

Code No: 07A7EC29

**R07****Set No. 2**

IV B.Tech I Semester Examinations, MAY 2011

CAD-CAM

Common to Aeronautical Engineering, Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions

All Questions carry equal marks

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1. A user uses a line operation and clicks close to end points  $P_1$  and  $P_2$  to close the polygon. shown in figure 1 When the user utilized a later operation to calculate the area enclosed by the polygon, the system issued an error message that the polygon was not closed. How is this possible and how can the user solve the problem? [16]

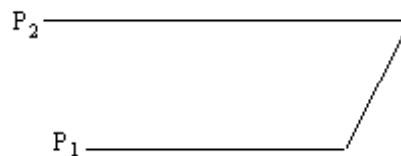


Figure 1

2. (a) What is a Dry run? Why is it required?  
 (b) Explain the importance of simulation of tool path in CNC machines. [8+8]
3. Derive the relationship between a point and its scaled counterpart  $p^*$  if  $P$  is scaled uniformly about a given point  $Q$  which is not the origin. [16]
4. (a) What are the types of plotters? Explain their working.  
 (b) Briefly describe the types of storage devices used in computers. [8+8]
5. (a) Discuss the role of Human resources in FMS.  
 (b) Discuss a few applications of FMS in detail. [8+8]
6. Write the first five digits in the Optiz system for the part illustrated in the figure 2. Give explanation of each code. All dimensions are in mm. [16]

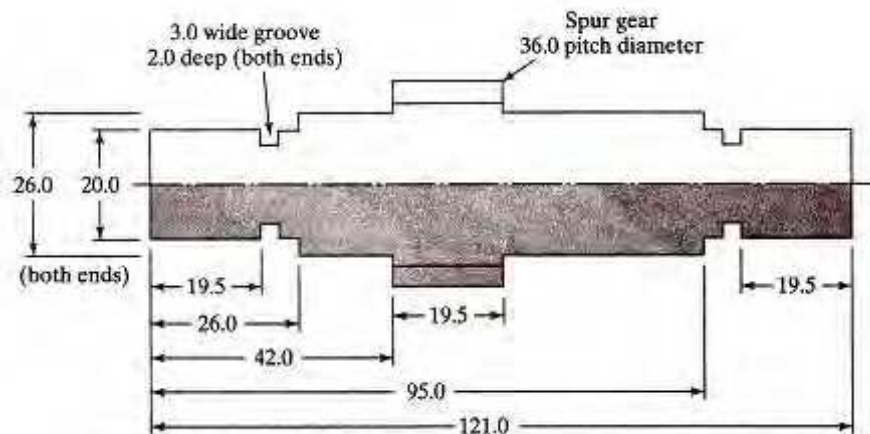


Figure 2

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7. How do you implement Lean Manufacturing in an Automobile plant? [16]
8. Find the condition that degenerates a cubic Bezier curve to a line connecting  $P_0$  and  $P_3$ . Derive a method by which you can force a Bezier curve to pass through a given point in addition to the starting and end points of its polygon. Achieve that by changing the position of only one control point, say  $P_2$ . [16]

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1. (a) List the benefits of CAD/CAM systems.  
(b) Explain how productivity increases by using CAD/CAM systems. [8+8]
2. What are the basic Geometric commands in AutoCAD? [16]
3. What are the outputs of MRP? Explain their uses. [16]
4. Show that parallel and perpendicular lines transform to parallel and perpendicular lines. [16]
5. A turning operation is to be performed on an NC lathe. Cutting speed = 2.5 m/sec, feed = 0.2 mm/rev, and depth = 4.0 mm. Work piece diameter = 100 mm and its length = 400 mm. Determine
  - (a) the rotational speed of the work bar.
  - (b) the feed rate,
  - (c) the metal removal rate and
  - (d) the time to travel from one end of the part to the other. [16]
6. (a) What are the limitations found in the general wire frame modeling systems? Explain with an example.  
(b) What is the best kind of modeling system? Explain with suitable sketches.  
(c) What are the various three-dimensional construction methods suitable for mechanical engineering applications? [16]
7. A GT machine cell contains three machines Machine 1 feeds machine 2, which is the key machine in the cell. Machine 2 feeds machine 3. The cell is set up to produce a family of five parts (A, B, C, D, and E). The operation times for each part at each machine are given in the table below. The products are to be produced in the ratios 4 : 3 : 2 : 2 : 1, respectively.
  - (a) If 35 hrs /week are worked, determine how many of each product will be made by the cell
  - (b) What is the utilization of each machine in the cell? [16]

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Part	Operation time (min)		
	Machine 1	Machine 2	Machine 3
A	4	15	10
B	15	18	7
C	26	20	15
D	15	20	10
E	8	16	10

8. Discuss the various network topologies used in CIM. Explain their relative advantages and disadvantages. [16]

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**R07****Set No. 1**

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Time: 3 hours

Max Marks: 80

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1. Specify the range of applications for which typical geometric modeling information is used. [16]
2. How does Lean production differ from Flexible production system? Explain. [16]
3. Find the geometric modifiers available on your CAD/CAM system. What is their syntax? How do you use them? What is the default modifier? [16]
4. (a) Distinguish between Vertical Machining center and Horizontal Machining center.  
(b) Discuss the advantages of computer assisted part programming over manual part programming. [8+8]
5. (a) What are the three modeling modes offered by CAD/CAM systems? What do they do?  
(b) How do you control the 3D modeling/construction of your geometric modeling activities on a CAD/CAM system. [8+8]
6. Describe the similarities and dissimilarities of GT layout with Product layout. [16]
7. Given three points  $P_1$ ,  $P_2$  and  $P_3$  that belong to a geometric model and given three other points  $Q_1$ ,  $Q_2$  and  $Q_3$  find the transformation matrix  $[T]$  that:
  - (a) Transforms  $P_1$  to  $Q_1$
  - (b) Transforms the direction of the vector  $(P_2 - P_1)$  into the direction of the vector  $(Q_2 - Q_1)$
  - (c) Transforms the plane of the three points  $P_1$ ,  $P_2$  and  $P_3$  into the plane of  $Q_1$ ,  $Q_2$  and  $Q_3$ . [16]
8. A finished product X is assembled from 3 subassemblies: A, B and C. Subassembly A consists of 3 units of D, 4 units of E and one unit of F. To make B, 1 unit of G and 3 units of H are needed. Subassembly C requires 2 units of J and 3 units of F. Component D requires 2 units of J and 1 unit of K.
  - (a) Construct the product structure tree for the finished product.
  - (b) Estimate the requirement of all items required to produce 200 units of X.
  - (c) If there are 50 units of A, 100 units of B, 150 units of D and 200 units of J already available in inventory, determine the net requirement of all items to produce 200 units of X. [16]

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**R07****Set No. 3**

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1. Bring out the differences between the Process type layout and GT layout. [16]
2. What are the input devices more commonly employed for general graphics applications? Explain in detail. [16]
3. How do you evaluate the performance of FMS? Explain in detail. [16]
4. CAD/CAM systems use parametric representation for surfaces as they do for curves. Explain how a surface is represented. [16]
5. Find all the layer-related commands on your system, specifically how to select/deselect layers, assign entities to layers, assign layers to entities, assign colors to layers, modify layer colors and modify layers of existing entities. [16]
6. Write the part program to drill the holes in the part shown in the figure 6. The part is 12.0 mm thick. Cutting speed = 100 m/min and feed = 0.06 mm/rev. Use the lower left corner of the part as the origin in the x-y axis system. Write the NC part program. Use absolute positioning. All dimensions are given in mm. [16]

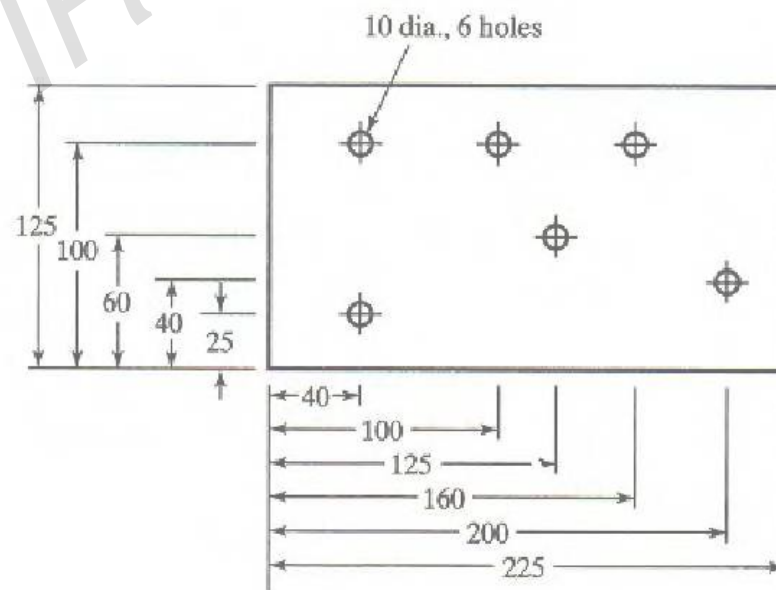


Figure 6

7. Prove that the multiplication of transformation matrices for the following sequence of operations is commutative.
  - (a) Two successive rotations

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- (b) Two successive translations
  - (c) Two successive scalings. [16]
8. Why are not the JIT concepts implemented in Indian and Western foreign Industries? Explain. [16]

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