

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013****Subject code: 715002****Date: 26-12-2013****Subject Name: CAD/CAM Systems****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Notations have usual meaning.

- Q.1** (a) Using a diagram explain the application of computers to the 'design process'. **07**
(b) Enlist and explain the functions of a graphics package. **07**

- Q.2** (a) Attempt any two: **07**
1. Enlist various functions a design workstation must accomplish. Why is the use of ICG found to be the best for it?
2. Write the generalized 4 x 4 transformation matrix that produces shear in three dimensions.
3. Define CAD and give reasons for implementing a CAD/CAM system.
(b) A triangle ABC with vertices $A(50, 40)$, $B(100, 60)$, and $C(70, 80)$ is to be scaled about the vertex A by factors 0.5 and 0.7 in x and y directions respectively. Determine: (i) the concatenated transformation matrix, and (ii) the coordinates of the vertices after scaling. **07**

OR

- (b) Explain the Digital Differential Analyser algorithm to generate a line segment stating its advantages and limitations. **07**
- Q.3** (a) Explain the parametric representation of a circle. Give two limitations of the non-parametric representation. **07**
(b) What is the need of graphics standards? Write a short note on IGES. **07**

OR

- Q.3** (a) Discuss the properties of Bezier curves. Justify the statement: 'A Bezier curve is superior to a cubic spline curve'. **07**
(b) Find the equation of the two-dimensional Hermite cubic spline starting at $P_0(2, 3)$ and ending at $P_1(10, 1)$. It is tangent to lines $P_0 P_2$ and $P_2 P_1$ where coordinates of P_2 are $(8, 6)$. Calculate five points on the curve. **07**
- Q.4** (a) Throw light on the two basic approaches developed for solid modeling. **07**
(b) Discuss the advantages and limitations of wire-frame modeling and surface modeling. **07**

OR

- Q.4** (a) What is a Primitive? Discuss various primitives and how a solid is created using them. **07**
(b) Explain the various surface entities provided by CAD/CAM systems. **07**
- Q.5** (a) Write a note on: NC programming with interactive graphics. **07**
(b) Explain the principle of concurrent engineering. **07**

OR

- Q.5** (a) What do you mean by optimum design? How does CAD help optimize an engineering design? **07**
(b) What are the problems with traditional process planning which led to development of CAPP systems? Explain how the process planning activity can be computer assisted. **07**