

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013****Subject code: 715002****Date: 04-06-2013****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.

- Q.1** (a) Explain the benefits of computer-aided design as compared to manual design. **07**
 (b) Explain the software configuration of a graphics system using a diagram. **07**
- Q.2** (a) Attempt any two: **07**
 1. Discuss raster scan and frame buffer.
 2. Explain 3D rotation about an arbitrary axis.
 3. Homogenous coordinate system and its importance in CAD.
 (b) The concatenated transformation of a graphics element consists of the **07**
 following operations: (i) rotation through 120° about z -axis, (ii) translation
 through 10 and -20 units along x - and y -directions respectively, (iii) rotation
 through 30° about x -axis. Write the homogenous transformation matrix, if the
 operations are done in above sequence.
 Will the sequence of operations affect the end result?
OR
 (b) Explain Bresenham's circle drawing algorithm. **07**
- Q.3** (a) Write the mathematics behind displaying a circle parametrically with radius 2 **07**
 and center located at (2, 2).
 (b) What is the need of graphics standards? Write a short note on IGES. **07**
OR
- Q.3** (a) Given $P_0 [1 \ 1]$, $P_1 [2 \ 3]$, $P_2 [4 \ 3]$ and $P_3 [3 \ 1]$ the vertices of a Bezier polygon, **07**
 determine seven points on the Bezier curve and plot them. Show that for any
 given value of the parameter, the summation of the basis functions is precisely
 one.
 (b) Explain in detail any two design-related tasks performed by a modern CAD **07**
 system.
- Q.4** (a) Write a note on constructive solid geometry. **07**
 (b) Explain geometry and topology as applied to solid modeling. **07**
OR
- Q.4** (a) Compare the merits and demerits of wire-frame modeling, surface modeling **07**
 and solid modeling with regard to difficulty in usage and area of application.
 (b) Explain the following entities used in surface modeling: (i) ruled surface, (ii) **07**
 tabulated surface, (iii) offset surface, (iv) Bezier surface. Also group them in
 to analytic surface and synthetic surface.
- Q.5** (a) Explain, in detail, the procedure a part programmer would carry out when he is **07**
 given a part drawing for NC code generation.
 (b) Explain the principle of concurrent engineering. **07**
OR
- Q.5** (a) Write about the scope of application of CNC technology in CAD/CAM **07**
 systems.
 (b) What do you mean by optimum design? How does CAD help optimize a **07**
 design?
