

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014****Subject code: 1720905****Date: 01-07-2014****Subject Name: Computer Aided Design****Time: 02:30 pm - 05:00 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)** Generate a straight line connecting two points (21, 11) and (26, 15) using Bresenham's line generating algorithm. **07**
- (b)** Differentiate between Conventional Machine Design and Computer Aided Design **07**
- Q.2 (a)** A triangle PQR with vertices P(1,1), Q(7,1) and R(1,6) is to be reflected about the line $4y - 2x - 12 = 0$. Determine : **07**
- (i) the concatenated transformation matrix and
(ii) the final coordinates of the vertices of a reflected triangle.
- (b)** Explain Zero order continuity, First Order Continuity and Second Order continuity with respect to synthetic curves. **07**
- OR**
- (b)** Enlist different factors influencing the selection or implementation of CAD/CAM Systems for your organization **07**
- Q.3 (a)** Explain different kinds of surfaces in detail. **07**
- (b)** Plot the Bezier curve having endpoints $P_0(0,0)$ and $P_3(7,0)$. The other control points are $P_1(7, 0)$ and $P_2(7,6)$. Plot for values for $u = 0, 0.1, 0.2, \dots, 1$, if the characteristic polygon is drawn in the sequence $P_0 - P_1 - P_2 - P_3$. **07**
- OR**
- Q.3 (a)** Sketch the area defined by the relation $x^2 + y^2 \leq 6(x^2 + y^2)^{1/2} + 9 \leq 3$ **07**
- (b)** Discuss the different techniques used for generating the picture on the CRT screen. **07**
- Q.4 (a)** A(0,0), B(1,1) & C(5,2) are the vertices of a triangle ABC which is to be rotated at angle of 45° about (a) the origin and (b) about a point X(-1,-1). Give transformed coordinates of A,B and C for both the cases. **07**
- (b)** Explain the concept of Feature based modeling **07**
- OR**
- Q.4 (a)** Explain various commonly used primitives for solid modeling and explain the Boolean operations. **07**
- (b)** The vertices of a Bezier polygon are $A_0 [2, 2]$, $A_1 [3, 4]$, $A_2 [3, 4]$ and $A_3 [5,4]$. Determine 4 points on the Bezier curve. **07**
- Q.5 (a)** What are twist vectors? Why are they needed as input if four boundary curves are given for a bicubic surface? **07**
- (b)** What is the function of a Graphic Standard? Explain any two of the Graphic Standards with their structure. **07**
- OR**
- Q.5 (a)** Explain C-Rep and B-Rep in detail **07**
- (b)** An ellipse is defined by the center point(8,10) and has a major radius of 10 units and minor radius of 4 units. Determine the various points on the ellipse in the first quadrant, if the increment between each point is 30° . Assume that the ellipse is oriented such that the major axis and minor axis are parallel to X and Y axes respectively. **07**