

GANPAT UNIVERSITY
M.Tech. Sem. Ist (CAD)
Regular Examination December 2014
3ME 113 Computer Aided Design

Time: 3 Hrs**Marks: 60****Instructions:**

- (i) All questions are compulsory.
- (ii) Answers to two sections must be written in separate answer books.
- (iii) Assume suitable data if required but state them clearly in your answer-books.
- (iv) Figure to the right indicates full marks.

SECTION - I

- Q1** Answer the following Questions. 10
- (a) Derive equations of decision variables for Bresenham's line algorithm.
 - (b) Discuss side effects of scan conversions.
 - (c) Write program for scan converted trigonometric hyperbola.
- OR**
- Q1** Answer the following Questions. 10
- (a) Explain utilization of CAD in Advancement of industries with suitable examples.
 - (b) Explain how circle can be represented efficiently by use of parametric representation.
 - (c) End point of line are (2, 08) and (12, 19). Find pixels by using DDA method.
- Q2** Answer the following Questions. 10
- (a) For triangle ABC having co-ordinates A(4,4), B(7,4) and C(4,9). Determine new vertex position if it is rotated 45° about vertex A.
 - (b) Explain zero, one and second continuity in blending of curve segments.
- OR**
- Q2** Answer the following Questions. 10
- (a) Derive equation for cubic curve segment.
 - (b) The coordinates of four control points relative to a current WCS are given A(3 3), B(5 4), C(7 6), D(8 7), find the equation of resulting Bezier curve. Also find point on the curve for $u=0.25, 0.5, 0.75$.
- Q3** Write answers on following (Any three) 10
- (a) Explain homogeneous co-ordinate and its properties. Derive composite matrix object rotation about its center in 2D.
 - (b) Explain PDES computer graphics standard.
 - (c) Write co-ordinate equations of following surfaces by rotation methods. Ellipsoid, paraboloid, spheroid, hyperboloid
 - (d) Write down steps for object mirror about any arbitrary line in plane.

SECTION - II

Q4 Answer the following Questions. 10

- (a) Why configuration of CAD workstation required very high? Explain with suitable example.
- (b) Define i) feature ii) Primitives iii) Homogeneous coordinate
- (c) Write properties & application of Bazier curve.

OR

Q4 Answer the following Questions. 10

- (a) What is wire frame modeling? Write its applications.
- (b) What is frame buffer? Explain 24 bit plane color frame buffer. Calculate memory requirement of 1024 X 768 resolution and 24 bit color.
- (c) Differentiate curve fairing and curve fitting techniques.

Q5 Answer the following Questions. 10

- (a) Write programme for scan converted parabola.
- (b) Discuss in brief "constructive solid modeling" technique of solid modeling.

OR

Q5 Answer the following Questions. 10

- (a) What is number synthesis? Explain it's importance enumerate all chain possible with $n=6$ and one degree of freedom.
- (b) Determine the length of all four bar links in a four bar chain for the length of the smallest being 10 cm to generate $Y = \log X$ in interval $1 \leq X \leq 10$ for three accuracy point. The range of the input and output links are given in degrees as follow. $45 \leq \theta \leq 120$
 $135 \leq \theta \leq 250$.

Q6 Answer the following Questions (ANY TWO). 10

- (a) Discuss the method of determining the angles for input and output link in a four bar mechanism for function generation.
- (b) A mechanism is to be designed to generate the function $Y = X^{0.8}$ for the range $1 \leq X \leq 3$, using three precision points. Find the three values of X and Y.
- (c) Synthesize a four bar mechanism to generate the function $y = 1/x$, $1 \leq x \leq 3$ using chebyshev spacing for three precision point. Assume $\theta_s = 45^\circ$, $\theta_F = 105^\circ$, $\phi_s = 135^\circ$ and $\phi_F = 225^\circ$. Take the length of the smallest link equal to 50 mm.