Ex. Seat No._____

# GANPAT UNIVERSITY

**M.Tech. Sem. I[st] (CAD-CAM)**

**Regular Examination January 2013**

**3ME-113 Computer Aided Design**

**Time: 3 Hrs** **Marks: 70**

**Instructions:**

(i) All questions are compulsory.

(ii) Answers to two sections must be written in separate answer sheets.

(iii)Assume suitable data wherever necessary.

(iv)Figure to right indicates marks.

## SECTION – I

**Q1** Answer the following Questions. **12**

**(a)** How CAD system (software & Hardware) is evaluated?

**(b)** Write a program of drawing a Circle by parametric representation in $C^{++}$.

**(c)** Obtain rotation transformation matrix for rotation of a positive vector [ X Y 1] about the point m, n through an arbitrary angle. Hence obtain the matrix for rotation of an object through $90^0$ counter clockwise direction about its center [3, 4].

**OR**

**Q1** Answer the following Questions. **12**

**(a)** Differentiate clearly between LCD & LED display devices. Give the specific areas of their applications.

**(b)** Explain significations of computer graphics in CAD. Give application of different entities used in real world.

**(c)** Explain scan conversion and derived equations for decision variable for midpoint algorithm of circle.

**Q2** Answer the following Questions. **12**

**(a)** Show that mirror and two dimensional rotation about the Z axis are not commutative.

**(b)** Write program for DDA line.

**(c)** A rectangle having coordinates A(7,4), B(10,4), C(10,7) and D(7,7). Determine new vertex position if it is reflected about line Y= 3X+2.

**OR**

**Q2** Answer the following Questions. **12**

**(a)** What is difference between entities and features?

**(b)** Draw flow chart for Slop method line generation and mention its merit and demerit over other algorithm.

**(c)** Obtain composite transformation matrix for effecting a translation in X, Y, Z direction by –l, -m, -n respectively followed successfully by + θ rotation about X axis and +φ rotation about Y axis on the homogeneous coordinate position vector [ x y z 1].

**Q.3** Answer the following Questions. **11**

**(a)** Discuss necessity of Graphics Standards. Explain IGES standard.

**(b)** What is interlaced and non interlaced monitor?

**(c)** Write co-ordinate equations of following surfaces by rotation methods.
Eillipsoid, paraboloid, spheroid, hyperboloid

**(d)** What are the side effects of raster scan? Explain in details.

## SECTION-II

**Q.4 Answer the following questions.**

(A) Write properties of Bezier curve.

(B) The coordinate to a current WCS are given as $P_0$ [ 4 4 0]$^T$, $P_1$ [ 4 5 0]$^T$, $P_2$ [ 5 5 0]$^T$, find the equation of resulting Bezier curve. Also find five intermediate points on the curve.

(C) Differentiate between solid modeling and surface modeling.

**OR**

**Q.4 Answer the following questions.** 12

(a) Write short notes on "NURBS".

(b) Write short note on CSG solid modeling.

(c) Derive constant matrix for continuity for cubic curve.

**Q.5 Answer the following questions.** 12

(a) Determine all possible chains of n=6 and degree of freedom one.

(b) Draw the kinematic diagram for scotch yoke mechanism and oldham's coupling.

(c) Function $Y = X^{1.4}$ in range 1<=X<=3, find 3 accuracy points by chebishev spacing.

**OR**

**Q.5 Answer the following questions.** 12

(a) Distingue degree of freedom and degree of mobility with example.

(b) Explain, "Revolute pair and prismatic pair are special cases of screw pair".

(c) Prove that in a mechanism the minimum numbers of binary links are four.

**Q.6 Answer the following questions.** 11

(a) Explain Kutzbach equation. Explain its importance in synthesis.

(b) For a 4-R linkage with line lengths as $l_1$, $l_2$, $l_3$ and $l_4$ obtain the angles $Q_3$ and $Q_4$ as function of the input movements $Q_2$ and the link lengths.

End of Paper