GANPAT UNIVERSITY
M. TECH AMT SEM- I CBCS (NEW)
REGULAR EXAMINATION NOV-DEC 2015
3ME 104 COMPUTER AIDED DESIGN

Max. Time: 3 hours **Max. Marks: 60 Marks**

Instructions:

1. Candidate can not keep with him any paper or book related to subject during the examination.
2. Center for written examination U.V.Patel College of Engineeering, Kherva.
3. Use of any electronic devices or programmable calculators is not allowed.

SECTION I

Que 1 Attempt all [10]

(A) What is the role of computers for design and manufacturing. Give the advantages and disadvantages of CAD systems. [5]

(B) Explain in brief the working principle of Laser Printer. [5]

OR

Que 1 Attempt all [10]

(A) Compare conventional design process with CAD systems and justify with example. [5]

(B) Explain the working principle of Ink Jet Plotters. [5]

Que 2 Attempt all [10]

(A) For the position vectors $P_1(2,3)$ and $P_2(5,7)$ determine the parametric representation of a line segment between them. Also determine the slope and tangent vector of the line segment. [4]

(B) Write a C++ program for ellipse. [6]

OR

Que 2 Attempt all [10]

(A) Obtain the parametric representation of a circle with radius=4 units and 8 unique points. [4]

(B) Derive the expression for Bresenham line algorithm for $|m|>1$. [6]

Que 3 Attempt all [10]

(A) Find the points on the ellipse in 1st quadrant having major axis=10 units and minor axis=6 units using midpoint ellipse algorithm. [6]

(B) Explain the curves having the following conditions: [4]

a) First order continuity

b) Second order continuity

SECTION II

Que 4 Attempt all [10]

(A) Show that the composition of two rotations is additive by concatenating the matrix representations for $R(\Theta_1)$ and $R(\Theta_2)$ to obtain $R(\Theta_1) \cdot R(\Theta_2) = R(\Theta_1 + \Theta_2)$ [4]

(B) Apply suitable 3D transformation matrix to the line joining (2,1,2) and (5,4,7) to align it to positive Y axis. [6]

OR

Que 4 Attempt all [10]

(A) Show that the transformation matrix for a reflection about the line y=-x is equivalent to a reflection relative to the y axis followed by a counter clockwise rotation of 90°. [4]

(B) Given P(1,1.5,2) and Q(4.5,6,3) do the following 3D transformations [6]

a) Scale PQ in x direction by 3 units keeping P Point fixed

b) Rotate line by 60° counter clockwise in X direction.

Que 5 Attempt all [10]

(A) Considering four dimensional position vectors for P_0((0,0), P_1(2,2), P_2(5,-2) and P_3(3,0), determine the cubic spline curve passing through them using chord approximation. The tangent vectors at the ends are P_1'(1,1) and P_4'(1,1). Calculate intermediate points at t=0.3 and t=0.7 [7]

(B) Write the properties of B-spline curves. [3]

OR

Que 5 Attempt all [10]

(A) Given B_0(1,2),B_2(2,5),B_3(6,5) and B_4(4,2) determine 6 points on the Bezier curve. [5]

(B) Write a Matlab code for Cubic Spline. [5]

Que 6 Attempt all [10]

(A) Distinguish the following CAD data exchange formats with help of example of cube of size of 20 units for all sides. [6]

a) IGES

b) STEP

c) DFX

(B) List various Geometric Techniques and explain wireframe model with advantages and disadvantages. [4]

OR

(B) Explain FEA concept with the help of example of 1-D bar element with application. [4]

END OF PAPER