Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2019

Subject Name : Computer Aided Design and Engineering

Subject Code : 4TE06CDE1 Branch: B.Tech (Mechanical)

Semester : 6 Date : 16/04/2019 Time : 10:30 To 01:30 Marks : 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions:

a) Full name of GKS is **01**
A) Graphical Kernel System B) Geographic Kernel System
C) Global Kernel System D) None of the above

b) The following is not a graphics standard **01**
A) GKS B) IGES
C) UNIX D) PHIGS

c) Which of the following is not a synthetic entity? **01**
A) Hyperbola B) Bezier Curve
C) B-spline curve D) Cubic spline curve

d) In the following three-dimensional modelling techniques. Which do not require much computer time and memory? **01**
A) Surface modeling B) Solid modeling
C) Wireframe modeling D) All of the above

e) 1 D Span element has…….node **01**
A) 1 B) 2 C) 3 D) 4

f) Expansion of line DDA algorithm is **01**
A) Digital difference analyzer B) Direct differential analyzer
C) Digital differential analyzer D) Data differential analyzer

g) The two-dimensional translation equation in the matrix form is **01**
A) P'=P+T B) P'=P-T C) P'=P*T D) P'=P

h) To generate a rotation , we must specify **01**
A) Rotation angle ɵ B) Distances dx and dy
C) Rotation distance D) All of the above

i) The two-dimensional scaling equation in the matrix form is **01**
A) P'=P+T B) P'=S*P C) P'=P*R D) P'=R+S

j) Triangular (quadratic) has ……node **01**
A) 3 B) 6 C) 9 D) 12

k) The number of pixels stored in the frame buffer of a graphics system is known as **01**
A) Resolution B) Depth
C) Resalution D) None of the above

l) _____ is used for detecting mouse motion. **01**

A) Optical sensor B) Rollers on the bottom of mouse
C) Both a and b D) Sensor

m) An accurate and efficient raster line-generating algorithm is **01**

A) DDA algorithm B) Mid-point algorithm
C) Parallel line algorithm D) Bresenham's line algorithm

n) On raster system, lines are plotted with **01**

A) Lines B) Dots
C) Pixels D) None of the mentioned

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions**

a) What do you understand by analytic curves and synthetic curves? **07**

b) Generate a straight line connecting two points (1, 2) and (8, 6) using DDA algorithm. **07**

Q-3 **Attempt all questions**

a) What is inverse transformation? Obtain the inverse transformation matrices for the following operations: **07**

i) Translation
ii) Rotation
iii) Scaling
iv) Reflection

b) What do you understand by geometry and topology in solid modeling? **04**

c) What is geometric modeling? **03**

Q-4 **Attempt all questions**

a) Generate a straight line connecting two points (21, 11) and (26, 15) using Bresenham's algorithm. **07**

b) Write a 3*3 transformation matrix for the following effects: **07**

i) Scale the image to be a twice as large and then translate it 1 unit to the left.
ii) Sale X direction to be half as large and then rotate anticlockwise by 90˚ about the origin.
iii) Rotate anticlockwise about origin by 90˚ and then scale the X direction by half as large.
iv) Translate down 0.5 unit, right 0.5 unit and then rotate anticlockwise by 45˚.

Q-5 **Attempt all questions**

a) A square with an edge length of 10 units is located on the origin with one of edge at an angle of 30˚ with the +X axis. Calculate the new position of the square if it is rotated by an angle 30˚ in the clockwise direction. **07**

b) What do you understand by C-rep and B-rep approaches? Compare them. **07**

Q-6 **Attempt all questions**

a) What do you understand by parametric and non-parametric **07**

representation of surface?

b) Why standardization is needed in computer graphics? State the various graphics standards available. **07**

Q-7 **Attempt all questions**

a) Distinguish between direct and indirect data exchange translators. **07**

b) What do you understand by 2D, 2 ½ D and 3D wife frame models? **04**

c) What is the element connectivity? **03**

Q-8 **Attempt all questions**

a) Explain the following terms used in optimization: **07**

i) Design Vector
ii) Design Constraints
iii) Objective Function

b) Consider the bar shown in Figure 1. An axial load F = 20000 N is applied as shown. Using the finite element find method find the following: **07**

i) Determine the nodal displacement
ii) Determine the stress in each section
iii) Determine the reaction forces

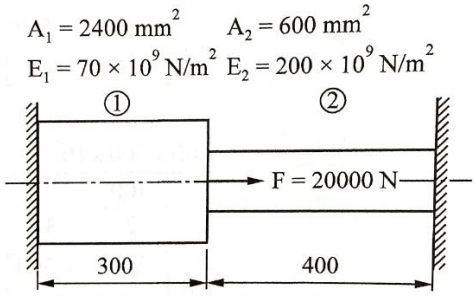

Figure: 1