Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Computer Aided Design and Engineering

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

Semester : 6 **Date : 23/04/2018** **Time : 02:30 To 05:30** **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:** **(14)**

a) Expansion of line DDA algorithm is
(A) Digital difference analyzer (B) Direct differential analyzer
(C) Digital differential analyzer (D) Data differential analyzer

b) The Cartesian slope-intercept equation for a straight line is
(A) y = m.x + b (B) y = b.x + m (C) y = x.x + m (D) y = b + m.m

c) Which algorithm is a faster method for calculating pixel positions?
(A) Bresenham's line algorithm (B) Parallel line algorithm
(C) Mid-point algorithm (D) DDA line algorithm

d) On raster system, lines are plotted with
(A) Lines (B) Dots (C) Pixels (D) None of the mentioned

e) A common device for drawing, painting, or interactively selecting coordinate positions on an object is a
(A) Image scanner (B) Digitizers (C) Data glove (D) Touch panels

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

g) The primary output device in a graphics system is_____
(A) Scanner (B) Video monitor (C) Neither (a) nor(b) (D) Printer

h) An accurate and efficient raster line-generating algorithm is
(A) DDA algorithm (B) Mid-point algorithm
(C) Parallel line algorithm (D) Bresenham's line algorithm

i) Aspect ratio means
(A) Number of pixels
(B) Ratio of vertical points to horizontal points
(C) Ratio of horizontal points to vertical points
(D) Both b and c

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

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

l) 1-D spar element has _____ node.
(A) 1 (B) 2 (C) 3 (D) 4

m) Triangular (quadratic) element has _____ node.
(A) 3 (B) 6 (C) 9 (D) 12

n) Which of the following devices do not produce a hard copy?
(A) Impact Printer (B) Plotters (C) CRT Terminals (D) Non-impact Printers

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

Q-2 **Attempt all questions**

(a) Compare conventional product life cycle vs CAD product life cycle. **(7)**

(b) Distinguish between analytic curve and synthetic curve. **(7)**

Q-3 **Attempt all questions**

(a) Discuss in detail about the applications of optimization in engineering. **(7)**

(b) List out the different output devices and explain any one. **(4)**

(c) Explain raster-scan display. **(3)**

Q-4 **Attempt all questions**

(a) Compare IGES and PDES. **(7)**

(b) Scan convert a circle whose centre is (10, 20) and the radius is 10 units using Bresenham's circle algorithm. **(7)**

Q-5 **Attempt all questions**

(a) Write a C++ program for design of shaft. **(7)**

(b) Discuss the requirements of product data exchange between dissimilar CAD/CAM systems. **(7)**

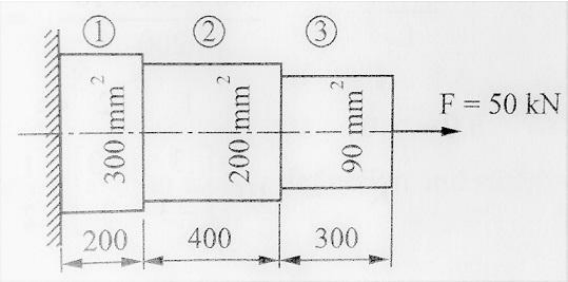
Q-6 **Attempt all questions**

(a) What is the significance of the shape functions? Obtain the shape functions in terms of natural coordinates for the two noded 1-D elements. **(7)**

(b) Generate a straight line connecting two points (1,2) and (8,6) using DDA algorithm. **(7)**

Q-7 **Attempt all questions**

(a) An axial stepped bar is as shown in Figure. It is subjected to an axial pull of 50 kN. If the material of the bar is uniform and has a modulus of elasticity as 200 GPa, determine the displacements and stresses of each of the section, using 1-D spar element. **(7)**



(b) What is element connectivity in context to establish local-global relationship? **(4)**

(c) Write merits, demerits and applications of FEM. **(3)**

Q-8 **Attempt all questions**

(a) Reflect the diamond shape polygon whose vertices are A (-1, 0), B (0, -2), C (1, 0) and D (0, 2) about the line $y = x + 2$. **(7)**

(b) Explain CSG and B-rep. **(4)**

(c) Write advantages of wire-frame modeling. **(3)**