Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY PDDC SEMESTER VI- EXAMINATION - SUMMER 2017

Subject Code: X61901Date: 29/0Subject Name: Computer Aided DesignTime: 10.30AM to 01.00PMTime: 10.30AM to 01.00PMTotal MarInstructions:Total Mar			9/04/2017 Iarks: 70	
Q.1	(a) (b)	Explain DDA algorithm for line generation with flow chart. Using transformation matrix determine the new coordinates of triangle A(20,30), B(50,40) and C(30,60) after it is rotated 30 degree clockwise about B.	07 07	
Q.2	(a)	Derive the parametric equation in matrix form for Bezier curve with four control	07	
	(b)	Give specification of CAD workstation with due justification	07	
	(b)	Explain the role of computer in Product Development Cycle. Support your answer with block diagram.	07	
Q.3	(a)	A 3D object is represented by the following six vertices: A(-5,20,50), B(-5,60,50), C(50,60,50), D(-5,20,80), E(-5,60,80), F(50,60,80) Generate the necessary concatenated transformation matrices for scaling the object by factor of 3 in all directions such that the vertex D remains unmoved. Find new coordinates of all vertices.	07	
	(b)	Hermite cubic spline is defined by two control points $(30, 10)$, $(70, 30)$ and two tangent vectors $(0.5 \ 0.6)$, $(1.2, 1.5)$. Find the equation of the curve. Evaluate the function for u=0, 0.2, 0.4, 0.6, 0.8 and 1.0.	07	
Q.3	(a)	OR Show that transformation matrix for a reflection about the line $Y = -X$ is equivalent to a reflection relative to the Y axis, followed by an anticlockwise rotation of 90°	07	
	(b)	Explain the parametric equation of line, circle, ellipse and parabola.	07	
Q.4	(a) (b)	Explain minimum potential energy principle. Determine the displacements of nodes of the spring system shown in figure using minimum potential energy method. $k_1 = 50, k_2 = 40, k_3 = 60 \text{ kN/mm}, F_2 = 50 \text{ kN}, F_4 = 100 \text{ kN}$	07 07	
		F_2 F_2 K_3 F_4		

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Q.4 (a) Explain general capabilities of various FEA software. (b) Determine the maximum stresses in an axially loaded bar as shown in the following 07 figure.



- Q.5 (a) Explain Constructive Solid Geometry.
 - (b) Products X and Y that are manufactured by a firm are sold with profit of Rs. 20 and Rs. 30, respectively. Both products have to be processed on machines A and B. Product X requires 10 minute on A and 20 minutes on B where as Product Y requires 20 minute on each machine. Machine A is not available for more than 6 hours 40 minutes per day, where as machine B is not available for more than 10 hours per day. Formulate the problem for profit maximization and solve using graphical method.

OR

- Q.5 (a) Explain the following CAD data transfer methods:
 - i) Neutral file format
 - ii) Direct CAD translator
 - (b) Determine the dimensions of an open box of maximum volume that can be constructed from an A4 sheet (210 mm x 297 mm) by cutting four squares of side x from the corners and folding and gluing the edges.

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