B.E. Mechanical Engineering Eighth Semester ME805 - Computer Aided Design

P. Pages : 3 Time : Three Hours		3 ee Hours $* 1593 *$	GUG/W/18/2080 Max. Marks : 80
	Note	 s: 1. All questions carry marks as indicated. 2. Answer 1 or 2, 3 or 4, 5 or 6, 7 or 8, and 9 or 10. 3. Use of non programmable calculators is permitted. 	
1.	a)	Define CAD: What are the advantages of CAD over conventional De-	sign Cycle? Explain. 8
	b)	What is frame buffer. Explain.	4
	c)	What are desirable features of line drawing algorithms.	4
		OR	
2.	a)	Derive an expression for decision parameter δ_1 , in case of Bresenhan	n's mid point ellipse 10
		generation algorithm in region I where $\frac{dy}{dx} < -1$.	
	b)	Simulate choice of pixel by DDA for drawing a line between (2, 3) ar	ad (8, 6). 6
3.	a)	A triangle having vertices at A (2, 1), B (4, 2) and C (3, 6) is to be reflected about its bare 10 AB. What are the sequence of steps to be performed. Find final position of triangle, after finding the transformation matrix.	
	b)	Write transformation matrix for 2D transformations for (1) X-Shear, (2) Y-Shear (3) Reflection about X (4) Reflection about	6 Y
		OR	
4.	a)	A cube of 6mm side having one corner at the origin is enlarged twice then translated 3mm in x-direction and 2mm in y-direction. Find the matrix for these operations.	e in all directions and 10 e final transformation
	b)	Write parametric form of Bezier curve B(u) with control points at $B_0(-1, 5)$, $B_1(2,0)$, $B_2(4,6)$ and $B_3(6,8)$. Evaluate this function a B(0.75), B(0.25) and B(0.8).	6
5.	a)	Discuss properties of stiffness matrix.	4

b) The lower ends of the three bars shown in fig Q5B are at the same level before the rigid 12 homogeneous 18Mg block is attached Each steel bar has an area of 600 mm^2 , E = 200GPa and length of 1.0m. For bronze bar, the area is 900 mm^2 , E = 83GPa and length is 1.6m. Find the stress developed in each bar.



OR

6. Consider the two bars shown in Fig. Q. 6. If the deformation of the right and is not to exceed 16 3mm, find nodal displacement, element stresses and support reactions. Take E=200GPa.



7. For the truss shown in Fig. Q. 7, Determine the displacement at nodes end stresses in each 16 member. Take E = 200GPa & A = 200 mm² for each member.



OR

8. The nodal co-ordinates of a triangular elements are shown in Fig. Q. 8A. At the interior a) point 'P' the x-Coordinate is 4 and $N_1 = 0.3$. Determine N₂, N₃ and Y.

coordinate of P.



b) For a triangular element with vertices at 1 (1, 1), 2 (8, 4) and 3 (2, 7) Obtain the strain 10 displacement matrix and hence determine strains \in_x, \in_y and γ_{xy} .



- 9. Discuss "Simplex search Method for multivariable optimization and also write an algorithm 10 a) for same.
 - b) Define the following terms with reference to optimal Design problem formulation.
 - Design variables i)
- Constraints ii)
- **Objective function** iii)
- Variable Bounds iv)

OR

10. Write short notes on any four.

- a) **Bisection Method**
- Shape functions for LBE c)
- Types of FE elements e)
- b) Golden Search Method
- Rasterization d)
- Synthetic Curves f)

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