Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER–VIII • EXAMINATION – SUMMER • 2014

Subject Code: 180205 **Date: 27-05-2014**

Subject Name: Automotive CAD

Time: 10:30 am - 01:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain different phases/steps involved in computer aided design process.	**07**
	(b)	Discuss different reasons for implementing CAD system. Also list down benefits & limitations of CAD.	**07**
Q.2	**(a)**	Solve the following system by Gauss elimination method: $2x + y + z = 10$; $3x + 2y + 3z = 18$; $x + 4y + 9z = 16$.	**07**
	(b)	Prepare a flow chart to implement Newton Raphson method to find roots of any given sets equations.	**07**
		OR	
	(b)	Explain different graphic displaying techniques.	**07**
Q.3	**(a)**	Write a short note on Bezier curves. Also discuss characteristics of Bezier curves.	**07**
	(b)	A rectangle is formed by four points ABCD whose coordinates are : A(50,50), B(100,50), C(100,80), D(50,80). Calculate the new coordinates of the rectangle in reduced size using the scaling factors Sx=0.5 and Sy=0.6. Also plot the coordinates.	**07**
		OR	
Q.3	**(a)**	Explain Wireframe modeling, Surface modeling, and Solid modeling with suitable sketches.	**07**
	(b)	Prove that the multiplication of two successive translation matrices is commutative.	**07**
Q.4	**(a)**	What are the different types of elements used in finite element analysis? Explain briefly with applications.	**04**
	(b)	Consider a three spring system as shown in figure 1. Take K_1 = 40 N/mm, K_2 = 50 N/mm, and K_3 = 80 N/mm. The loads applied are P_1 = 100 N, P_2 = 50 N. Calculate the displacement at nodal points.	**10**
		OR	
Q.4	**(a)**	What is optimization? Explain different techniques used for analysis of optimization.	**07**
	(b)	Prepare a C-program to design a coil spring for a suspension system. Assume suitable notations and material for the coil spring.	**07**
Q.5	**(a)**	Explain how to model and apply boundary conditions for a hollow cylinder subjected to internal pressure, with one end closed.	**04**
	(b)	Consider a bar as shown in figure 2. Determine the displacements and support reactions by penalty approach method. Take modulus of elasticity as 80×10^3 N/mm^2.	**10**
		OR	
Q.5	**(a)**	List down various 3D CAD softwares used in solid modeling. Explain any one software with suitable automotive applications in detail.	**07**

(b) Explain the basic principle of DDA algorithm for drawing a line. Also prepare a flow chart for line drawing using DDA algorithm. **07**

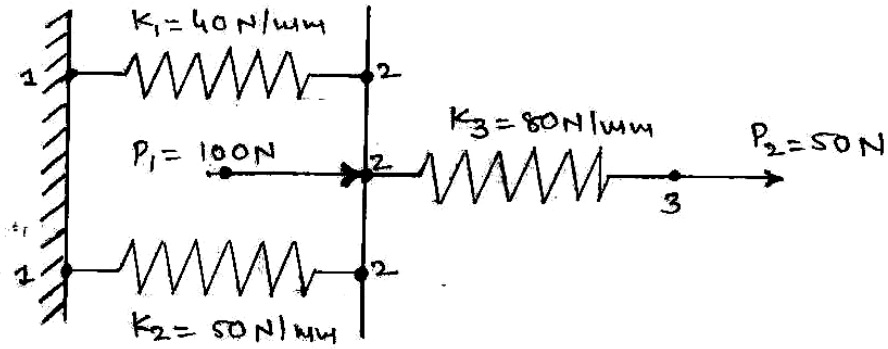

Figure : 1 [Q-4 (b)]

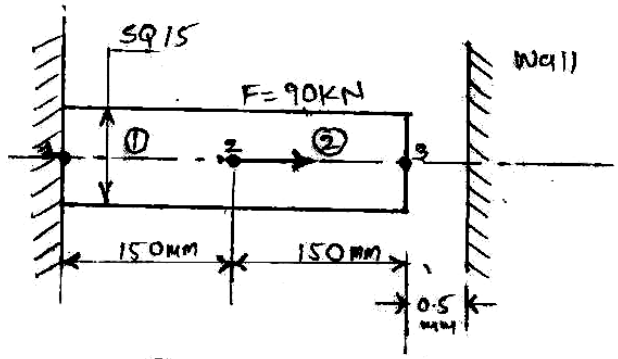

Figure : 2 [Q-5 (b)]

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