Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VIII.EXAMINATION – WINTER 2016

Subject Code: 180205 **Date: 22/10/2016**

Subject Name: Automotive CAD (Department Elective-II)

Time: 02:30 PM to 05:00 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 the following graphic display techniques : (i) Raster scan display (ii) Vector display (iii) Direct view storage tube .	**07**
	(b)	Discuss different steps of CAD process in engineering.	**07**
Q.2	**(a)**	List down different hardwares used in CAD system. Explain each briefly with suitable sketches.	**07**
	(b)	Prepare a flow chart for line drawing using DDA algorithm.	**07**
		OR	
	(b)	An axial stepped bas is shown in figure-1. It is subjected to an axial pull of 5 KN. If the material of bas is uniform and has modulus of elasticity as 200 GPa. Find displacement of each element by using elimination approach method. All dimensions are in mm.	**07**
Q.3	**(a)**	State advantages, limitations and applications of finite element method.	**07**
	(b)	Explain Newton Raphson method to find roots of equations.	**07**
		OR	
Q.3	**(a)**	Solve the following simultaneous equations by Gauss elimination method. $X_1 - 3X_2 + 4X_3 = 2$; $2X_1 + 3X_2 + X_3 = 3$; $-X_1 + 2X_2 + 3X_3 = 5$.	**07**
	(b)	Explain different steps involved in FEM to design the automotive components.	**07**
Q.4	**(a)**	Determine the displacements of nodes and elemental stresses for the bar as shown in figure 2. Take: $A_1 = 400\ mm^2$, $A_2 = 500\ mm^2$, $l_1 = l_2 = 200$ mm, $l_3 = 250$mm, $P_1 = P_2 = 10$ kN and E = 200 GPa.	**07**
	(b)	Write a short note on the following: (i) Homogeneous coordinates in transformations. (ii) Concatenation of transformations.	**07**
		OR	
Q.4	**(a)**	A triangle ABC with vertices A(30,20), B(90,20), and C(30,80) is to be scaled by a factor of 0.5 about a point X(50,40). Determine the new coordinates of the vertices for a scaled triangle.	**07**
	(b)	Explain different types of modeling with suitable sketches.	**07**
Q.5	**(a)**	Consider a cluster of four springs as shown in figure 3. Calculate deflections of each spring when a force of 2000N is applied. Model the spring as 1D spar elements.	**07**
	(b)	The three vertices of triangle PQR are: P(50,20), Q(110,20), and R(80,60). Determine the coordinates of the vertices for the new reflected triangle, if it is to be reflected about: (i) X-axis ; and (ii) line y=x.	**07**
		OR	
Q.5	**(a)**	Write a short note on B-Spline curves.	**07**
	(b)	With suitable sketches, explain different types of co-ordinate systems required for geometric display systems.	**07**

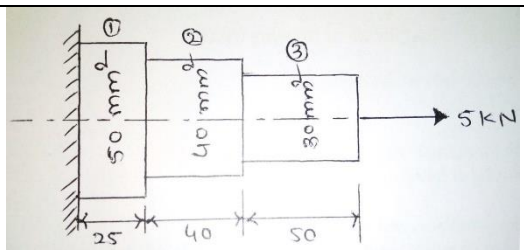

Figure: 1

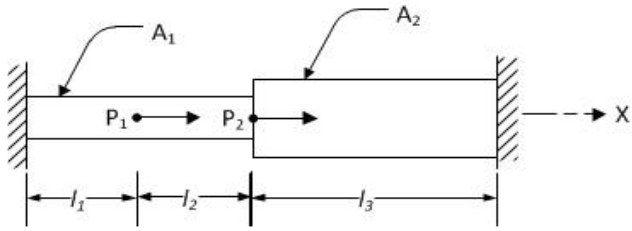

Figure: 2

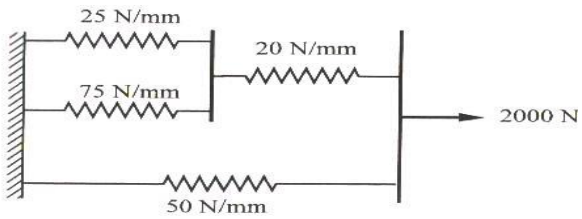

Figure: 3

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