Seat No.: _____   Enrolment No._____
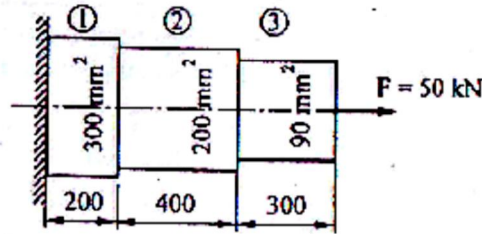
GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 161903   **Date: 28-05-2013**

Subject Name: Computer Aided Design

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)**	What are different software package used in CAD. Give specification of CAD work station.	**07**
	(b)	What are the advantages of CAD in design? Explain application of Computers to the design process.	**07**
Q.2	**(a)**	The coordinates of the triangle 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**
	(b)	Define and explain Bresenham's algorithm.	**07**
		OR	
	(b)	Derive the transformation matrix for the Rotation. Further give the transformation matrix for scaling,reflection and shear.	**07**
Q.3	**(a)**	Explain B-spline curve and mention its advantages.	**07**
	(b)	Explain the following surfaces 1. Patch 2. Ruled 3. Coons	**07**
		OR	
Q.3	**(a)**	With neat sketch explain the characteristics of Bezier curve and mention its advantages.	**07**
	(b)	Compare CSG and B-rep techniques of solid modeling	**07**
Q.4	**(a)**	Why graphic standard plays important roles in CAD. Enlist various graphic standards with full name.	**07**
	(b)	Explain IGES graphic standard in detail with structure.	**07**
		OR	
Q.4	**(a)**	Explain the following terms used in optimization. 1. Design constraint 2. Objective Function	**04**
Q.4	**(b)**	Recommend the optimum material and dimensions for a machine shaft subjected to twisting moment of 3 KNm and desiring a torsional stiffness of 100 Nm/degree, so as to have a minimum weight of the shaft, Following materials are available	**10**

Sr. No.	Material	Mass density kg/m	Yield strength MPa	Modulus of rigidity GPa	Material factor $\ell G/\sigma^2_y$
1.	Mg. Alloy	1760	225	16	5.53×10^{-4}
2.	Plastic	1200	55	2	8.533×10^{-4}
3.	Ti-Alloy	3600	910	42	1.825×10^{-4}
4.	Steel	7650	1380	84	3.374×10^{-4}

Q.5 **(a)** Explain general procedure for doing Finite Element Analysis. Give stiffness **07**
matrix for structural analysis.

(b) Explain Penalty approach and Elimination approach for FEA. **07**

OR

Q.5 **(a)** What are the different types of Elements **04**

(b) An axial stepped bar as shown in figure is subjected to an axial pull of 50 **10**
KN. If the material of the bar is uniform and has a modulus of elasticity as
200 GPa. Determine the displacement and stresses of each of the section.
Also find the reaction.

****

2