Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI- EXAMINATION – SUMMER 2016

Subject Code:161903 **Date:09/05/2016**

Subject Name:Computer Aided Design

Time: 10:30 AM to 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)**	Write a Breshnham's algorithm for line having slop more than 45°	**07**
	(b)	Explain IGES graphic standard in detail with structure.	**07**
Q.2	**(a)**	A triangle ABC with vertices A(0,0), B(4,0) and C(2,3) is Translated through 4 and 2 units along X and Y directions respectively and then Rotated through 90° in counterclockwise direction about the new position of point C. Find: (1) The concatenated transformation matrix and (2) The new position of triangle	**07**
	(b)	Write parametric equation for Bezier curve. Briefly discuss its characteristics.	**07**
		OR	
	(b)	Explain analytic curves and synthetic curves with example.	**07**
Q.3	**(a)**	Compare CSG and B-rep techniques of solid modeling.	**07**
	(b)	Differentiate between wireframe modeling and solid modeling technique.	**07**
		OR	
Q.3	**(a)**	Enlist the various methods of geometric modeling. Discuss wire frame modeling in detail.	**07**
	(b)	Discuss steps involved in feature based modeling. List most commonly used feature operations in CAD systems.	**07**
Q.4	**(a)**	Derive from fundamentals the parametric equation for the Hermite Cubic spline. Represent the equation in matrix form.	**07**
	(b)	State different commercial CAD software available and explain the features of any two CAD software in detail.	**07**
		OR	
Q.4	**(a)**	What is FEA? Explain steps required to carry out FEA.	**07**
	(b)	**Fig.1** shows the compound section fixed at both ends. With the help of FEA estimate the reaction forces at the supports and the stresses in each material when a force of 200 KN is applied at the change of cross section.	**07**

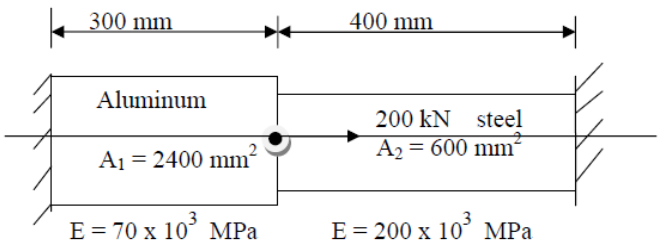

Fig. 1 Q.4(b)

Q.5	**(a)**	What do you mean by primary and subsidiary design equation? Explain with example.	**07**

(b) A system of a rigid cart connected by three linear springs as shown in **Fig.2**. The force of 60 N is acting on cart as shown in figure. Determine the following: **07**

(1) Use finite element concept to assemble the elemental stiffness matrices of three linear springs into global stiffness matrix.

(2) Write global load vector.

(3) Find Nodal solution.

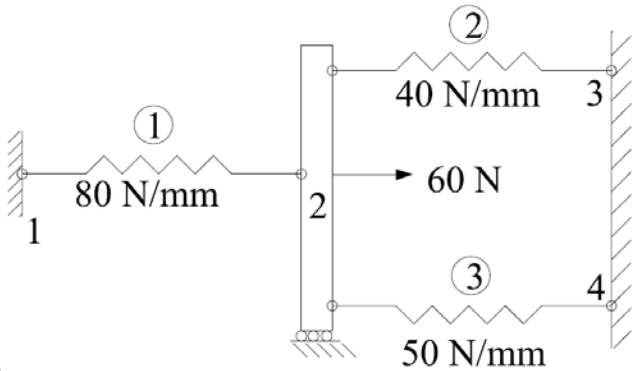

Fig. 2 Q.5(b)

OR

Q.5 **(a)** Explain Johnson method of optimum design with an example. **07**

(b) A gear manufacturing unit manufactures helical gear and worm gear pairs using lathe machines, hobbing machines and profile grinding machines. The machining time required for each type of gear pair, the machining time available on different machines and the profit on each type of gear pair are given below: **07**

Type of machine	Machining time required for		Maximum Machining time available per week, minutes
	Helical Gear Pair, minutes	Worm Gear Pair, Minutes	
Lathe Machine	10	20	4000
Hobbing Machine	25	10	5000
Profile Grinding Machine	06	14	2100
Profit Per Unit	Rs. 800	Rs. 2000	

Determine the number of helical gear pairs and worm gear pairs manufactured per week to maximize the profit.

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