Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- VIth SEMESTER–EXAMINATION – MAY- 2012

Subject code: 161903 **Date: 15/05/2012**

Subject Name: Computer Aided Design (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)**	What do you mean by Computer Aided Design (CAD)? Discuss reasons for implementing CAD in industry.	**07**
	(b)	Give your Comments on the need for standardisation in Computer Graphics. Briefly discuss about various graphics standards available.	**07**
Q.2	**(a)**	A triangle ABC with vertices A(0,0), B(4,0) and C(2,3). Perform the following operations for it. (i) Translation through 4 and 2 units along X and Y directions respectively. (ii) Rotation through 90^0 in counterclockwise direction about the new position of point C.	**07**
	(b)	Explain DDA algorithm for generation of line.	**07**
		OR	
	(b)	Explain Bresenham's algorithm for generation of line.	**07**
Q.3	**(a)**	Briefly discuss about B-spline curve and Bezier curve.	**07**
	(b)	List various approaches used for creating solid models. Discuss about Constructive solid modelling (C-Rep) and Boundary representation (B-Rep) approaches.	**07**
		OR	
Q.3	**(a)**	What is feature based modelling? Discuss various steps involved in creation of models using features.	**07**
	(b)	What do you mean by 2D and 3D wireframe modeling? Differentiate between wireframe modeling and solid modeling technique for CAD.	**07**
Q.4	**(a)**	Explain the concept of finite element method. Discuss about various steps involved in finite element analysis.	**07**
	(b)	Consider the stepped bar shown in fig. -1. A load P=200 KN is applied as shown. Determine the nodal displacements, element stresses, and support reactions. use elimination approach for boundary conditions. Take E= $2x10^5$ N/mm^2.	**07**
		OR	
Q.4	**(a)**	State and describe the various types of elements used in the finite element analysis.	**07**
	(b)	A stepped bimetallic bar made of Aluminium (E= $70x10^3$ N/mm^2) and steel (E= $200x10^3$ N/mm^2) is subjected to an axial load of 200 KN, as shown in the fig.- 2. Using finite element method, determine (i) the nodal displacements (ii) the stresses in each material and (iii) the reaction forces at the supports.	**07**
Q.5	**(a)**	Discuss in detail about the applications of optimization in engineering.	**07**
	(b)	Classify optimization problems on various basis.	**07**
		OR	

Q.5 **(a)** Explain the concept of optimization in engineering. **07**

(b) A cylindrical shell of the heat exchanger is required to accumulate a total of 100 m length of standard diameter copper tubes. 1 m^2 cross sectional area inside the shell can accommodate 200 copper tubes. Design heat exchanger shell with an objective of minimizing the cost of H.E. by using following data. **07**

(i) cost of copper tubes= Rs. 20,000

(ii) cost of H.E. shell = Rs. 60,000 $D^{2.5}$ L

(iii) cost of floor space occupied = Rs. 10,000 DL

Where D = Diameter of H.E. shell in m

L= length of H.E. shell in m

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All dimensions are in mm.

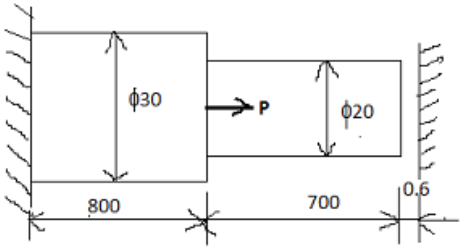

Fig.-1

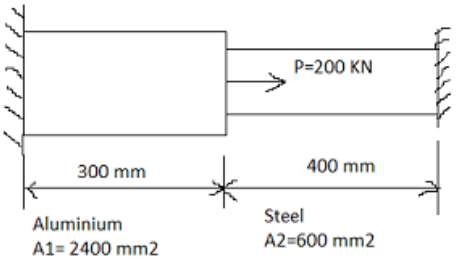

Fig.-2