Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–I(New course)• EXAMINATION – WINTER- 2015

Subject Code: 2715002 **Date: 01/01/2016**

Subject Name: CAD/CAM system

Time:2:30 pm to 5:00 pm **Total Marks: 70**

Instructions:

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

Q.1 **(a)** Explain the product life-cycle with CAD/CAM overlaid. 07

(b) Enlist all the solids features that you know for feature-based modeling. What does each one create? 07

Q.2 **(a)** Enlist the design-related tasks a modern CAD system can do. Explain any two of them in detail. 07

(b) Consider the block defined by the position vectors A(1, 1, 2), B(2, 1, 2), C(2, 2, 2), D(1, 2, 2), E(1, 1, 1), F(2, 1, 1), G(2, 2, 1), H(1, 2, 1) relative to the global *xyz*-axis system. Rotate the block +30° about the local *x'*-axis passing through the centroid of the block. The origin of the local axis system is assumed to be the centroid of the block. The global *x*-axis and local *x'*-axis are parallel to each other. The centroid of the block is (3/2, 3/2, 3/2). 07

OR

(b) A line is defined by end points (0, 0) and (2, 3) in a 2-D graphics system. Express the line in matrix notation and perform the following transformations on this line: 07

a) Scale the line by a factor of 2.0.
b) Scale the original line by a factor of 3.0 in *x*-direction and 2.0 in *y*-direction.
c) Translate the original line by 2.0 units in *x*-direction and 2.0 units in *y*-direction.
d) Rotate the original line by 45° about the origin.
e) Plot the original line and each of the four transformations on a graph paper.

Q.3 **(a)** 1. Sketch the geometric parameters required to define a helix. 07
2. Formulate the equation of the 2-D Bezier curve for which the control points are: P_0 (1, 3), P_1 (3, 5), P_2 (5, 4), and P_3 (7, 1).

(b) What is the difference between *curve fitting (interpolation)* and *curve fairing (approximation)* technique? Compare the properties of Bezier and B-spline curve approximation. 07

OR

Q.3 **(a)** Write a detailed note on *wire-frame modeling.* 07

(b) Explain the parametric representation of an ellipse. How is parametric representation superior to its counterpart? 07

Q.4 **(a)** Briefly explain various descriptions of major surface entities provided by CAD/CAM systems. 07

(b) You are given the task of making a solid model of the stop block shown in Figure 1. Provide clear guidelines for this task. You may draw necessary sketches. All dimensions are in inches. 07

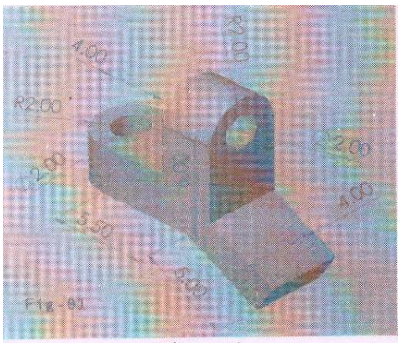

Figure 1

OR

Q.4	**(a)**	Given the task of creating surface model of the stop block shown in Figure 1, write down the sequential procedure. State the type of surface entities you use	07
	(b)	Write a detailed note on: Constructive-solid Geometry approach for solid modeling.	07
Q.5	**(a)**	What are the problems with traditional process planning which led to development of CAPP systems? Explain how the process planning activity can be computer assisted.	07
	(b)	Elaborate the concept of 'simultaneous engineering' stating its benefits and barriers against its implementation.	07

OR

Q.5	**(a)**	Explain the various NC motion-control systems.	07
	(b)	Write a note on: The NC procedure.	07

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