

GUJARAT TECHNOLOGICAL UNIVERSITY
ME – SEMESTER – I (New)– EXAMINATION – WINTER-2019

Subject Code: 3710802**Date: 03-01-2020****Subject Name: Computer Aided Design****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 characteristics of an open non-periodic B-spline curve. **07**
 (b) Write a short note on Half-spaces. **07**
- Q.2** (a) Derive an expression to calculate length of a curve. **07**
 (b) Give brief on blending of two curves considering C_0 , C_1 , and C_2 continuities. **07**
- OR**
- (b) A triangle ABC having vertices A(5,5), B(0,5) and C(5,0) is rotated. Determine the new vertices if:
 i It is rotated 90° anticlockwise about vertex A, interpret the result. **03**
 ii It is rotated 180° anticlockwise about vertex A, interpret the result. **03**
 iii It undergoes sequential rotations first clockwise 60° about origin, then anticlockwise 30° about origin. **01**
- Q.3** (a) Show that the translation is commutative while rotation is not a commutative transformation. **07**
 (b) What do you mean by feature based modeling? Enlist the different primitives used in the feature based modeling. How do you perform manipulations on features? **07**
- OR**
- Q.3** (a) Compare bottom-up and top-down approaches in assembly modeling. **07**
 (b) What are the most common primitives used in solid modeling? Give their parametric equations. **07**
- Q.4** (a) Describe briefly representation of following surface entities:
 i Ruled surface **02**
 ii Tabulated surface **02**
 iii Surface of revolution **02**
 iv Plane surface **01**
 (b) Explain relative advantages and disadvantages of CSG approach with example. **07**
- OR**
- Q.4** (a) Prove that the curvature of a circular cylinder is zero. What is the radius of curvature at any point on its surface? **07**
 (b) Give the parametric representation of an ellipse with major axis as X-axis and minor as Y-axis. Give the updated parametric representation of ellipse if its major axis makes an angle α with X-axis. **07**
- Q.5** (a) Explain the role of a CAD system in product life cycle. You may take a case study to justify your answer. **07**
 (b) Find the point $(0.25, 90^\circ)$ on the surface of revolution of a line segment with end points (1, 1, 0) and (5, 2, 0). This line segment is rotated about the X axis. **07**

OR

- Q.5 (a)** Why various data exchange formats are essential in the CAD software? **07**
Which data exchange have you used to transfer data and how did you overcome the problems associated with the data exchange?
- (b)** Derive the equation of Bezier curve with three control points. Give your **07**
comments on the types of curves you may obtain.

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