

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER –I-(New) EXAMINATION – SUMMER 2019

Subject Code: 3710802

Date: 09/05/2019

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) Draw a product life cycle diagram along with its various phases. State various software tools used during this stage. How computer aided design is used for development of such tools? **07**
- (b) What is scan conversion? Explain Bresenham's algorithm for generation of line with flow chart. **07**
- Q.2** (a) What is a need of homogeneous transformations usage in computer graphics? What are the advantages of homogeneous coordinates? Represent translation, rotation and scaling matrices for 3D transformations in homogeneous form. **07**
- (b) A triangle ABC having coordinates A(5,5),B(8,5)and C(5,10) .Determine the new vertex position if: **07**
- 1) The triangle is rotated by 60° anticlockwise about vertex A.
 - 2) The triangle is scaled by 2 times in X direction and 3 times in Y direction about vertex A.
- OR**
- (b) Reflect a diamond shaped polygon whose vertices are A (-1, 0),B (0,-2) ,C (1, 0) and D (0, 2) about **07**
- i) The horizontal line $y = 2$
 - ii) The vertical line $x = 2$
 - iii) The line $y = x + 2$
- Q.3** (a) Write general expression of β -spline curve defined by $n+1$ control points. State the characteristics of β -spline curve. **07**
- (b) The end points of a Bezier curve are $P_0(3,2)$ and $P_3(1,3)$.The other control points of the curve are $P_1(6,0)$ and $P_2(7,6)$. **07**
1. Determine the parametric equation of curve.
 2. Plot the Bezier curves if the direction of polygon is P_0 - P_1 - P_2 - P_3 .
- OR**
- Q.3** (a) From an algebraic form of a parametric cubic curve, deduce a generalized expression for Hermite curves. **07**
- (b) Differentiate between parametric and synthetic curves. Explain various orders of continuity of curves used in engineering applications. **07**
- Q.4** (a) Explain Bezier's surfaces and Ruled surfaces in brief. **07**

- (b) Differentiate between Constructive Solid Geometry (CSG) and boundary representation schemes of solid representation. Explain the role of Boolean operations in CSG. **07**

OR

- Q.4 (a)** Explain the following surface entities: **07**
(i) Offset surface (ii) Coons surface
(iii) Surface of revolution (iv) Plane surface

- (b) Write a note on: -Wire frame modeling and surface modeling. **07**
State the limitations and applications of each of these modelling techniques.

- Q.5 (a)** What is feature based modeling? Explain sketched features. **07**

- (b) Explain Bottom-up assembly modelling and Top-down assembly modelling approach. **07**

OR

- Q.5 (a)** Enlist various data exchange formats used in CAD software. What is role of data exchange formats? Explain IGES data representations and structure. **07**

- (b) Explain features and feature entities in feature based modeling? What do you mean by feature manipulations? **07**
