

# C.U.SHAH UNIVERSITY

## Winter Examination-2018

Subject Name: Computer Aided Design and Modeling

Subject Code: 5TE01CDM1

Branch: M.Tech Mechanical (CAD/CAM)

Semester: 1

Date : 26/11/2018

Time : 02:30 To 05:30

Marks : 70

### Instructions:

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
  - (2) Instructions written on main answer book are strictly to be obeyed.
  - (3) Draw neat diagrams and figures (if necessary) at right places.
  - (4) Assume suitable data if needed.
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### SECTION – I

**Q-1 Attempt the Following questions (07)**

- a. State the different applications of CAD.
- b. Enlist the various software's available in CAD.
- c. State the Limitation of a Wire-Frame Modelling.
- d. Write the full form of the following video display hardware: i). LCD ii). LED
- e. State the limitation of cubic spline curve.
- f. State the advantages of solid Modeling.
- g. What is surface of revolution?

**Q-2 Attempt all questions (14)**

- (a) Discuss the reasons for implementing CAD. Also Draw a Diagram showing product cycle with the implementation of CAD.
- (b) Develop the parametric equations for i) line ii) Circle iii) Ellipse

**OR**

**Q-2 Attempt all questions (14)**

- (a) Explain B-spline curve and mention its advantages.
- (b) Derive general parametric equation for Hermite cubic spline curve in matrix form.

**Q-3 Attempt all questions (14)**

- (a) What do you understand by 2 ½ D model? Clearly distinguish it from 3-D model.
- (b) A Bezier curve is to be constructed using control points P0 (35, 30), P1 (25, 0), P2 (15, 25) and P3 (5, 10). The Bezier curve is anchored at P0 and P3. Find the equation of the Bezier curve and plot the curve for  $u= 0, 0.2, 0.4, 0.6, 0.8$  and 1.

**OR**

- Q-3**
- (a) Discuss the important features of Pro-Engineer solid modeling software.
  - (b) Distinguish between B-Rep and C-Rep of Solid modeling techniques.



## SECTION – II

- Q-4 Attempt the Following questions (07)**
- What is meant by a scan conversion?
  - State the Advantage of Bresenham's line algorithm.
  - Define Homogenous Transformation matrix.
  - What is Graphics Kernel System (GKS)?
  - What is visual realism?
  - What is graphic standard?
  - Write the full form of the following graphics standards. i) PHIGS ii) VDM

- Q-5 Attempt all questions (14)**
- Explain Bresenham's algorithm for generation of line.
  - Derive the transformation matrices for following 2-D transformation.  
i) Scaling ii) Rotation.

**OR**

- Q-5 (a)** Generate a straight line connecting two point (1,2) and (8,6) using DDA Algorithm.
- (b)** Prove that  $R(\theta_1) \cdot R(\theta_2) = R(\theta_1 + \theta_2)$  for geometrical transformation.

- Q-6 Attempt all questions (14)**
- A Triangle PQR with Vertices P (2, 5) Q (6, 7) and R (2, 7) is to be reflected about line  $Y = 0.5 X + 3$ . Determine the Concatenated transformation matrix.
  - Prepare an algorithm and write a C program for the design of Spur Gear.

**OR**

- Q-6 Attempt all Questions**
- A tetrahedron is defined by points A(10, 15, 20), B(30, 15, 20), C(10, 25, 20) and D(20, 20, 50). Calculate the new coordinates of the tetrahedron, if it is rotated about X axis by  $60^\circ$  in CCW direction followed by rotation about Y axis by  $45^\circ$  in CCW direction.
  - Prepare an algorithm and write a C program for the design of Helical spring.

