SEAT No. :

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### [5869]-289

## S.E. (Information Technology)
## COMPUTER GRAPHICS
### (2019 Pattern) (Semester - IV) (214453)

*Time : 2½ Hours]*          *[Max. Marks : 70*

*Instructions to the candidates:*

*1)*   *Answers Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
*2)*   *Neat diagrams must be drawn whenever necessary.*
*3)*   *Figures to the right side indicate full marks.*
*4)*   *Assume suitable data if necessary.*

*Q1)* a)   Explain the basic transformation techniques in 3D Graphics.    **[6]**

     i)   Scaling      ii)   Rotation      iii)   Translation

    b)   Use the Cohen-Sutherland algorithm for clipping window having clipping window whose lower left point at (2,1), upper right point at (7,5) and line points are (1,3) and (5,6). Find the intersection points.    **[6]**

    c)   Explain the following term with example               **[6]**

     i)   Windowing    ii)   Clipping      iii)   Viewport

**OR**

*Q2)* a)   Explain with diagram parallel and perspective projection.    **[6]**

    b)   Explain 3D Transformation rotation about arbitrary axis.    **[6]**

    c)   Using Sutherland-Hodgeman method, Clip Polygon ABCDE against window PQRS. The coordinators of polygon are A(80,200), B(220,120), C(150, 100), D(100, 30), E(10, 120). Coordinates of the window are P(200, 50), Q(50, 150), R(200,150), S(50, 50).    **[6]**

*Q3)* a)   What is segment? Explain different operations on segment with example.
                                                            **[6]**

    b)   Explain RGB, HSV and HLS color models.    **[6]**

    c)   Explain with diagram Gourand shading algorithm in detail.    **[5]**

**OR**

*Q4)* a) Explain the concept of segment table and display file. **[6]**

b) Explain with diagram Phong shading algorithm in detail. **[6]**

c) Define color gamut. Explain with diagram CIE Chromaticity Diagram. **[5]**

*Q5)* a) Differentiate between Bezier curve and B-spline curve. **[6]**

b) Write a short note on Interpolation and approximation. **[6]**

c) Explain various types of animation languages. **[6]**

OR

*Q6)* a) Explain Bezier curve. List its properties. **[6]**

b) Write short notes on: **[6]**

i) Koch curve

ii) Frame-by-frame Animation techniques

c) What is fractal? Explain Hilbert curve in detail **[6]**

*Q7)* a) What is the different usage of Virtual Reality? Explain in detail. **[6]**

b) What is Haptics Rendering Pipeline Modeling in Virtual Reality? **[6]**

c) Differentiate HMD and CAVE in Virtual Reality. **[5]**

OR

*Q8)* a) Explain the Graphics Rendering Pipeline. **[6]**

b) Explain the applications of Virtual Reality systems. **[6]**

c) Explain 3D position trackers. **[5]**

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