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Total Number of Pages : 02

B.Tech  
PCS51102

5<sup>th</sup> Semester Regular / Back Examination 2019-20

COMPUTER GRAPHICS

BRANCH : CSE

Max Marks : 100

Time : 3 Hours

Q.CODE : HRB162

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- Differentiate raster scan and random scan systems.
- List the disadvantages of DDA.
- Mention the importance of homogeneous coordinate system.
- What is dither noise? Mention the importance of dither matrix.
- Define window-to-viewport transformation.
- Define shear transformation.
- Define self-affine fractal.
- Write the different types of animation.
- Define flat surface rendering.
- What is virtual reality?

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Illustrate Bresenham's line drawing algorithm to draw a line with endpoint (5, 15) and (15, 25).
- A triangle has its vertices at A(1, 1), B (3, 1) and C(2, 2). It is translated by 7 units along -ve X -direction and then rotated clockwise by  $45^\circ$  about P (0,2). Determine the new vertex positions of the triangle.
- Derive a transformation matrix for reflection about the diagonal  $y = -x$ .
- Consider the clipping window with vertices A(2,1), B(4,1), C(4,3) and D(2,3). Use Cohen-Sutherland algorithm to clip a line A(-4, -5) B(5,4) against this window (show all intermediate steps).
- Write Scan line polygon fill algorithm. Explain each step of this algorithm by taking a suitable example.
- Define aliasing. Mention problems associated with aliasing. Discuss anti-aliasing techniques with their relative merits and demerits.
- Derive a transformation matrix for a scaling transformation with respect to any fixed point  $(x_f, y_f, z_f)$ .
- What is parallel projection? Categorize parallel projection with respect to different view planes. Derive a transformation matrix for oblique parallel projection.
- Make a classification of visible surface detection methods. Discuss how Painter's algorithm is helpful for visible surface detection. List its advantages and disadvantages.
- Describe a basic illumination model (considering ambient light, diffuse reflection and specular reflection).
- Explain the working of Gouraud surface rendering method.
- What is animation? Name the different techniques used for animation. Make comparison between key frame and procedural animation.

**Part-III**

**Only Long Answer Type Questions (Answer Any Two out of Four)**

**Q3** Derive the incremental computation on which the mid-point circle algorithm is based. Write the different steps of this algorithm. Use this algorithm to draw a circle with radius 4 cm and center located at (5,10) **(16)**

**Q4** What is Bezier curve? Write the basic equations for generating Bezier curve. Discuss its properties. Derive Bezier matrix for cubic Bezier curve. **(16)**

**Q5** Define perspective projection. Derive perspective projection transformation matrix. Discuss the special cases associated with this. **(16)**

**Q6** Explain the working of the following algorithms :  
a. Depth buffer  
b. A-buffer  
List out their relative advantages and disadvantages. **(16)**