

V SEMESTER B.TECH.(COMPUTER SCIENCE AND ENGINEERING) DEGREE
MAKE UP EXAMINATION-JANUARY 2014(10 Point Credit)
SUBJECT: COMPUTER GRAPHICS (CSE 307)
DATE: 07-01-2014

TIME: 3 HOURS

MAX.MARKS: 50

Instructions to Candidates

- **Note:** Answer any **FIVE** full questions.
- **Do not seek any clarification from the room invigilator**
- **Show all the steps where ever is required and assume suitably**

1.A. Explain the operation of a delta-delta, shadow mask CRT with neat sketch.

1.B. List the statements needed to set up the OpenGL display window to light gray. What command would we use to set the color of the display window to black?

1.C. Rasterize the line segment from (-1,-1) to (-6,-7) using Bresenham's line method. (4+2+4)

2.A. Derive decision parameters for the midpoint ellipse algorithm assuming the start position as (0,b) and points are to be generated along the curve path in clockwise order.

2.B. Consider the following polygon with edges. Draw a polygon, Construct Global Edge Table, Active Edge Table when Scan Line is 6.

Edge No	Begin Vertex Co-ordinates	End Vertex Co-ordinates
1	1,1	1,4
2	1,4	3,6
3	3,6	5,5
4	5,5	7,8
5	7,8	9,3
6	9,3	10,2
7	10,2	12,6
8	12,6	12,1
9	12,1	1,1

2.C. Write a short note on 2D Rigid-Body Transformation. (5+3+2)

3.A. Consider the line L and triangle ΔABC . The equation of line L is $y = 0.5(x+4)$. Position vectors are $A=[2 \ 4 \ 1]$, $B=[4 \ 6 \ 1]$ and $C=[2 \ 6 \ 1]$. Reflect the triangle ΔABC about the line L and find the triangle $\Delta A'B'C'$.

3.B. Consider the Position vectors of a block are $A=[1 \ 1 \ 2 \ 1]$, $B=[2 \ 1 \ 2 \ 1]$, $C=[2 \ 2 \ 2 \ 1]$, $D=[1 \ 2 \ 2 \ 1]$, $E=[1 \ 1 \ 1 \ 1]$, $F=[2 \ 1 \ 1 \ 1]$, $G=[2 \ 2 \ 1 \ 1]$ and $H=[1 \ 2 \ 1 \ 1]$. Perform the rotation of the block about x' -axis by an angle $\theta=30^\circ$, which is local x' -axis pass through the centroid of the block. The coordinates of the centroid of the block is $[3/2 \ 3/2 \ 3/2 \ 1]$. (6+4)

4.A. Consider the polygon with edges are $AB=[(-4 \ -4) \ (-4 \ 2)]$, $BC=[(-4 \ 2) \ (0 \ 2)]$, $CD=[(0 \ 2) \ (2 \ -1)]$, $DE=[(2 \ -1) \ (2 \ -4)]$, $EF=[(2 \ -4) \ (-1 \ -4)]$, $FG=[(-1 \ -4) \ (-3 \ -2)]$ and $GA=[(-3 \ -2) \ (-4 \ -4)]$. Find the Screen coordinates of the polygon when window specified by coordinates $(-6 \ -6)$ and $(4 \ 4)$ onto a viewport specified by coordinates $(1 \ 1)$ and $(6 \ 5)$.

4.B. Derive all the necessary parametric equations (inequalities) of a line between points $(x_1 \ y_1)$ and $(x_2 \ y_2)$, in terms of parameter t against clipping window boundaries.

4.C. What are orthogonal-projection view volume and near-far clipping planes?

4.D. Write atleast four differences between orthographic projection and oblique projection. (3+3+2+2)

5.A. Derive the parametric equation for a cubic Bezier curve.

5.B. Consider three points $A(1 \ 2 \ 0)$, $B(2 \ 4 \ 6)$ and $C(3 \ 6 \ 20)$. Which point obscures the others when viewed from the point $P(0 \ 0 \ -10)$? Explain.

5.C. Write the Z-Buffer algorithm and explain the performance evaluation.

5.D. What is halftone approximation patterns? "With n by n pixels for each grid on a bilevel system, we represent $n^2 + 1$ intensity levels" Justify your answer. (3+2+2+(1+2))

6.A. What you mean by local and global illumination models? Differentiate between them.

6.B. Write a short note on shadow.

6.C. Write the difference between real-time animation and frame by frame animation.

6.D. Briefly explain the traditional animation techniques. (3+2+2+3)