

**Set 1:**

<b>Name:</b>	 <b>UPES</b> UNIVERSITY WITH A PURPOSE
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, May 2019**

**Course: Computer Graphics**  
**Program: B-Tech CSE All Branches**  
**Course Code: CSEG329**

**Semester: VI**  
**Time 03 hrs.**  
**Max. Marks: 100**

**Instructions:****SECTION A (Attempt all)**

S. No.		Marks	CO
Q 1.	Illustrate Composite Transformation with proper matrix representation?	4	CO3
Q 2.	Define the term clipping and explain curve clipping and exterior clipping?	4	CO2
Q 3.	Justify that Open GL platform independent with proper explanation.	4	CO1
Q 4.	Differentiate between uniform and non-uniform scaling with proper explanation.	4	CO3
Q 5.	Elaborate the concept of Phong Shading with mathematical formulations.	4	CO5


**SECTION B (Attempt all)**

Q 6.	a) Windowport is given by (100,100,300,300) & viewport is given by (50,50,150,150), convert the window port co-ordinate (200,200) to viewport co-ordinate. In addition, explain the term graphics software standards.	6+4=1 0	CO4
Q 7.	a) Explain the properties for B-Spline curve & Determine 5 points on a Bezier curve for $\Theta$ vertices $B_0(1,1)$ , $B_1(2,3)$ , $B_2(4,3)$ , $B_3(3,1)$ . OR b) Differentiate between DDA Line and Brasenham Line Drawing algorithm and Implement the DDA line algorithm to draw a line from (0,0) to (6,7) and explain each step.	5+5=1 0  5+5=1 0	CO4,C O1,CO 2
Q 8.	Explain rotation about X axis,Y axis and Z axis with respect to 3D and explain it with proper diagram and matrix format. Also, explain affine transformation with proper matrix representations.	7+3=1 0	CO3
Q 9.	Use Cohen Sutherland line clipping algorithm to clip line P1(70,20) and P2(100,10) against a lower left hand corner (10,10) and upper right hand corner (80,40) and after clipping to find the intersection point. Also, define CRT with proper diagram.	6+4=1 0	CO2

**SECTION-C (Attempt all)**

Q 10.	a) A solid tetrahedron is given by position vectors $A(1,1,1), B(3,1,1), C(2,1,3)$ and $D(2,2,2)$ and a point light source is kept at $P(2,3,4)$ . Using back face detection method, find the surfaces on which the light falls and the surfaces which are to be shadowed. b) The pyramid defined by the coordinates $A(0,0,0), B(1,0,0), C(0,1,0)$ and $D(0,0,1)$ is rotated 45 deg about the line $L$ that has the direction $V = J + K$ and passing through point $C(0,1,0)$ . Find the coordinates of the rotated figure.	<b>10+10 =20</b>	<b>CO5,C O4,CO 3</b>
Q 11.	(a) Explain Color models used in Computer Graphics illumination and explain the term 2D transformation with proper coordinate and matrix representation along with the help of proper diagram. OR (b) Explain the term 3D transformation with proper coordinate and matrix representation along with the help of proper diagram and differentiate between Beizer Curve and B Spline Curve with proper mathematical terms.	<b>10+10 =20</b>	<b>CO2,C O3,CO 4</b>

**Set 2:**

Name:			
Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, May 2019</b>			
<b>Course: Computer Graphics</b> <b>Program: B-Tech CSE All Branches</b> <b>Course Code: CSEG329</b>		<b>Semester: VI</b> <b>Time 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions:</b>			
<b>SECTION A (Attempt all)</b>			
S. No.		<b>Marks</b>	<b>CO</b>
Q 1.	Illustrate and discuss Reflection and Shearing?	4	<b>CO3</b>
Q 2.	Explain the term clipping, also illustrate Weiler Atherton polygon clipping?	4	<b>CO2</b>
Q 3.	Justify that Open GL platform independent with proper explanation.	4	<b>CO1</b>
Q 4.	How to draw a curve using NURBS ? Do explain its advantages.	4	<b>CO4</b>
Q 5.	Explain Gouraud and Phong Shading along with their advantages and disadvantage.	4	<b>CO5</b>
<b>SECTION B (Attempt all)</b>			
Q 6.	a) The position vectors for the vertices of a triangular surface are given by A(10,0,0) B(0,10,0), C(0,0,10). A point light source is at P(0,0,20). Find the intensities at the vertices of the quadrilateral. If the ambient light intensity is 1 and the directional light intensity is 10. Assume $K_a=K_d=0.3$ . Neglect any intensity attenuation and specular effect. b) State the differences between Beam Penetration and Shadow Mask method	7+3=1 0	<b>CO5,C O1</b>
Q 7.	a) Prove that 2D rotation and scaling commutative if $S_x=S_y$ or $\theta=n\pi$ b) Consider a square A(1,0), B(0,0), C(0,1), D(1,1) and rotate the square ABCD by 45 degree clockwise about A(1,0). <b>OR</b> c) State and explain the Z-buffer algorithm and mention the advantage and disadvantages of it. d) Define the term blending function.	4+6=1 0  8+2=1 0	<b>CO4,C O1,CO 2</b>
Q 8.	a) Construct enough points on the Bezier curve whose control points are P0(4,2), P1(8,8), P2(16,4) to draw an accurate sketch. And answer the followings (i) What is the degree of the curve (ii) What are the co ordinates at U=0.5 b) Illustrate the different types of Knot Vector.	7+3=1 0	<b>CO4</b>
Q 9.	a) State Sutherland-Hodgeman polygon clipping algorithm and mention its	6+4=1	<b>CO2,C</b>

	<p>advantages.</p> <p>b) State the differences between concave &amp; convex polygon with diagram.</p>	<b>0</b>	<b>O3</b>
<b>SECTION-C (Attempt all)</b>			
Q 10.	<p>a) A solid tetrahedron is given by position vectors A(1,1,1),B(3,1,1),C(2,1,3) and D(2,2,2) and a point light source is kept at P(2,3,4).Using back face detection method, find the surfaces on which the light falls and the surfaces which are to be shadowed.</p> <p>b) Perform reflection of Unit cube about the xy plane.</p> <p>c) A rectangular parallelepiped is given having length on x axis,y axis and z axis as 3,2,1 respectively. Perform a rotation by an angle -90 degree about x-axis and an angle 90 degree about y-axis.</p>	<b>10+5+5=20</b>	<b>CO5,C04,CO3</b>
Q 11.	<p>a) Explain Color models used in Computer Graphics illumination method and discuss the concepts of Liang Barsky Line clipping.</p> <p style="text-align: center;">OR</p> <p>b) Differentiate between Beizer Curve and B Spline Curve with proper mathematical terms, and explain the term Reflection through XY,YZ,XZ planes with proper diagram and matrix formulations.</p>	<b>10+10=20</b>	<b>CO2,C03,CO4</b>