GALGOTIAS UNIVERSITY

SCHOOL OF COMPUTING SCIENCE AND ENGINEERING

QUESTION BANK

Course Name / Code : CSE323 – COMPUTER GRAPHICS **Programme: B. Tech / III Yr / VI Sem**

Course Coordinator : Gokul Rajan V

UNIT – I INTRODUCTION AND LINE GENERATION

S. No	Questions	CO	Bloom's Taxonomy Level	Difficulty Level	Competitive Question Y/N	Area	Topic	Unit	Mark
1	An e-publishing company is in the process of converting e-book in the form of document image to text. Discuss on the challenges faced by the company in implementing the process.	1	Understand	Medium	Yes (UGC NET)	Introduction	Frame Buffer	1	2
2	Compute the resolution of a 2 X 2 inch image that has 512 X 512 pixels.	1	Apply	Medium	No	Introduction	Random Scan Display	1	2
3	If we want to resize a 1024 X 768 image to one that is 640 pixels wide the same aspect ratio, find out the height of the resized image?	1	Remember	Low	No	Introduction	Frame Buffer	1	2
4	If we use 2-byte pixel values in a 24 bit lookup table representation, Find how many bytes does the lookup table occupy?	1	Remember	Low	No	Introduction	Frame Buffer	1	2
5	List the steps required to plot a line whose slope is between 0 degree and 45 degree using the slope intercept equation?	1	Remember	Low	No	Introduction	Frame Buffer	1	2
6	List steps are required to plot a line whose slope is between 0 degree and 45 degree using Bresenham's Algorithm?	1	Remember	Low	No	Introduction	Frame Buffer	1	2
7	Calculate the pixel location approximating the first octant of a circle having centre at (4, 5) and radius 4 units using Bresenham algorithm.	1	Apply	Medium	Yes (UGC NET)	Introduction	Types of CG	1	6
8	List the steps are required to generate a circle using the polynomial method?	1	Remember	Low	No	Introduction	Types of CG	1	2
9	List the steps are required to generate a circle using the trigonometric method?	1	Remember	Low	Yes (UGC NET)	Introduction	Points and Lines	1	2

10	Define Computer Graphics.	1	Remember	Low	No	Introduction	Points and Lines	1	2
11	Write bresenham's line drawing algorithm and trace the algorithm for the given points (2, 1) to (10, 12)	1	Apply	Medium	No	Introduction	Points and Lines	1	6
12	Consider a raster system with a resolution of 1024 X 1024. Calculate the size of raster needed to store 4 bit per pixel.	1	Remember	Low	No	Introduction	Points and Lines	1	2
13	Define halftone image?	1	Remember	Low	No	Introduction	Raster Scan Display	1	2
14	What is aspect ratio?	1	Understand	Medium	No	Introduction	Raster Scan Display	1	2
15	Using the Bresenham line generation algorithm, digitize the line with end points (20, 10) and (30, 18).	1	Analyze	Medium	Yes (UGC NET)	Introduction	Raster Scan Display	1	6
16	Compare Bresenham line generation with DDA line Generation.	1	Understand	Medium	No	Introduction	Introducti on	1	6
17	Using the Bresenham line generation algorithm, digitize the line with end points (15, 5) and (25, 13).	1	Evaluate	High	No	Introduction	Points	1	6
18	Rasterize the line from (-1,1) to (5,-8) using Bresenham's line drawing Algorithm.	1	Apply	Medium	No	Introduction	Lines	1	6
19	Given radius r=10 determine positions along with the circle octants in 1st Quadrant from x=0 to x=y.	1	Apply	Medium	Yes (UGC NET)	Introduction	Lines	1	10
20	Do you need to generate the full circumference of the circle using the algorithm, or can we generate it in a quadrant or octant only and then use it to produce the rest of the circumference?	1	Understand	Low	Yes (UGC NET)	Introduction	Introducti on	1	2
21	Given a circle radius r=5 determine positions along the circle octants in 1st Quadrant from x=0 to x=y.	1	Apply	Medium	No	Introduction	Circle Algorithm	1	6
22	Using midpoint circle generation algorithm, compute the coordinates of points that lie on the circumference of the circle with radius 5 and center as (7,7).	1	Analyze	High	No	Introduction	Circle Algorithm	1	10
23	Distinguish between scan line polygon fill and seed fill (flood fill) algorithm.	1	Analyze	High	No	Introduction	Circle Algorithm	1	9
24	How vector CRT is different from Raster CRT.	1	Remember	Low	Yes (UGC NET)	Introduction	Circle Algorithm	1	2
25									
26	Consider a Non-Interlaced raster system with resolution of 1280 By 1024,	1	Remember	Low	No	Introduction	Introducti on	1	2

	a refresh rate of 60 Hz, a horizontal retrace time of 5 Microseconds and a vertical retrace time of 500 μs. What is the fraction of the total refresh time per frame spent in horizontal retrace of the electron beam?								
27	Find the equation of the line y'=mx'+b in xy coordinates if the x'y' coordinate system results from a 90 degree rotation of the xy coordinate system.	1	Understand	Medium	No	Introduction	Ellipse Algorithm	1	6
28	What are the criteria of generating a straight line on raster scan display device?	1	Understand	Medium	Yes (UGC NET)	Introduction	Ellipse Algorithm	1	6
29	Explain shadow mask and beam penetration method.	1	Understand	Medium	Yes (UGC NET)	Introduction	Ellipse Algorithm	1	6
30	Explain Scan line fill polygon filling algorithm.	1	Understand	Medium	Yes (UGC NET)	Introduction	Attributes	1	6
31	Explain midpoint ellipse algorithm	1	Remember	Low	No	Introduction	Line Algorithm	1	2
32	Differentiate emissive and non-emissive displays?	1	Understand	Medium	No	Introduction	Line Algorithm	1	2
33	Explain: Sampling and quantization	1	Understand	Medium	No	Introduction	Line Algorithm	1	2
34	State whether the given statement is true or false: "Fluorescence is the term used to describe the light off by a phosphor after it has been exposed to an electron beam". Explain your answer.	1	Evaluate	High	No	Introduction	Display	1	4
35	If a boundary is 8-connected, can 8-boundary fill algorithm be used to fill the region bounded by that boundary? If no, Why?	1	Apply	Medium	No	Introduction	Midpoint Algorithm	1	6
36	Define seed-fill algorithms? Write 8-connected region filling algorithm? Out of 4-connected and 8-connected seed fill algorithm, which algorithm would you use to fill 8-connected boundary region?	1	Apply	Medium	Yes (UGC NET)	Introduction	Midpoint Algorithm	1	8
37	Write are the principal of vanishing point?	1	Understand	Medium	Yes (UGC NET)	Introduction	Midpoint Algorithm	1	6
38	Explain in detail working of shadow mask and beam penetration CRT.	1	Remember	Low	No	Introduction	Input Devices	1	2
39	List steps are required to plot a line whose slope is between 0 to 60 degree using Bresenham's method?	1	Understand	Medium	No	Introduction	Input Devices	1	2
40	Give an equation for the plane containing the point (0,0,0) and normal to vector (-1,0,-1).	1	Apply	Medium	No	Introduction	Input Devices	1	6
41	Discuss why is the electron beam allowed to overscan?	1	Understand	Low	Yes (UGC	Introduction	Output Primitives	1	2

					NET)				
42	Explain the 3D display methods.	1	Evaluating	High	No	Introduction	Output Primitives	1	4
43	When 8 way symmetry is used to obtain a full circle from pixel coordinates generated for the 0 degree to 45 degree or the 90 degree to 45 degree octant, certain pixels are set or plotted twice. This phenomenon is sometimes referred to as overstrike. Justify where overstrike occurs.	1	Remember	Low	No	Introduction	Output Primitives	1	6
44	List steps required to generate an ellipse using polynomial method?	1	Remember	Low	No	Introduction	3D Display	1	2
45	When 4-way symmetry is used to obtain a full ellipse form pixel coordinates generated for the first quadrant, does overstrike occurs? Where?	1	Analyze	High	Yes (UGC NET)	Introduction	Display Devices	1	10
46	List the operating characteristics for the folLowing display technologies: raster refresh systems, vector refresh systems, plasma panels, and .CDs.	1	Apply	Medium	Yes (UGC NET)	Introduction	Introduction	1	6
47	Determine the resolution (pixels per centimeter) in the x and y directions for the video monitor in use on your system. Determine the aspect ratio, and explain how relative proportions of objects can be maintained on your system.	1	Apply	Medium	No	Introduction	Display Devices	1	6
48	Consider three different raster systems with resolutiuns of 640 by 400, 1280 by 1024 and 2560 by 2048. What size frame buffer (in bvtejl is needed for each of these systems to store 12 bits per pixel? How, much storage is required for each system if 24 bits per pixel are to be stored?	1	Apply	Medium	No	Introduction	Introduction	1	6
49	Suppose an RGB raster system is to be designed using an 8-inch by 10-inch screen with a resolution of 100 pixels per inch in each direction. If we want to store h bit5 per pixel in the frame buffer, how much storage (in bytes) do we need for the frame buffer?	1	Remember	Low	No	Introduction	Introduction	1	2
50	Define refreshing of the screen?	1	Remember	Low	Yes (UGC NET)	Introduction	Introduction	1	2
51	List out the merits and demerits of DVST.	1	Remember	Low	No	Introduction	Display Devices	1	2
52	Describe in detail about the DDA scan conversion algorithm?	1	Understand	Medium	Yes (UGC NET)	Introduction	Introduction	1	6
53	Write down and explain the midpoint circle drawing algorithm. Assume 10 cm as the radius and co-ordinate origin as the centre of the circle.	1	Understand	Medium	No	Introduction	Introduction	1	6
54	Explain in detail about Bresenham‟s ellipse generating algorithm. Give	1	Analyze	Medium	No	Introduction	Display Devices	1	10

	example.								
55	Differentiate raster and random scan systems.	1	Remember	Low	No	Introduction	Display Devices	1	6

UNIT-II TRANSFORMATIONS

S. No.	Questions	CO	Bloom's Taxonomy Level	Difficulty Level	Competitive Exam Question Y/N	Area	Topic	Unit	Marks
1	Define Transformation.	2	Apply	Medium	No	Transformation	Basic Transformation	2	2
2	List out the various Text clipping.	2	Remember	Low	No	Transformation	Clipping	2	2
3	Explain about window to viewport coordinate transformation.	2	Remember	Low	No	Transformation	Window to viewport coordinate	2	8
4	Write a detailed note on the basic two dimensional transformations.	2	Understand	Medium	No	Transformation	Cohan Sutherland	2	6
5	Explain with an example the Cohen-Sutherland line clipping algorithm.	2	Analyze	Medium	Yes (UGC NET)	Transformation	Liang barsky	2	6
6	Compare Cohen-Sutherland line clipping algorithm and Liang-Barsky line clipping algorithm.	2	Understand	Medium	No	Transformation	Polygon Clipping	2	6
7	Write the general form of the matrix for rotation about a point P(h, k).	2	Evaluate	High	No	Transformation	Basic transformation	2	10
8	Perform a 45 degree rotation of triangle A(0, 0), B(1, 1), C(5, 2) about P(-1, -1)	2	Apply	Medium	No	Transformation	Basic transformation	2	8
9	Magnify the triangle with vertices A(0, 0), B(1, 1) and C(5, 2) to twice its size while keeping C(5, 2) fixed.	2	Apply	Medium	Yes (UGC NET)	Transformation	Basic transformation	2	6
10	Reflect the diamond shaped polygon whose vertices are A(-1, 0), B(0, -2), C(1, 0) and D(0, 2) about the line y=x+2.	2	Apply	Medium	Yes (UGC NET)	Transformation	Basic transformation	2	6
11	The matrix $\begin{matrix}1 & a\\ b & 1\end{matrix}$ defines a transformation called a simultaneous shearing for short. The special case when b=0 is shearing in the x	2	Apply	Medium	No	Transformation	Basic transformation	2	6

	direction. When a=0, we have shearing in the y direction. Illustrate the effect of these shearing transformations on the square A(0, 0), B(1, 0), C(1, 1), and D(0, 1) when a=2 an b=3.								
12	An observer standing at the origin sees a point P(1, 1). If the point is translate one unit in the direction v=1, its new coordinate position is P'(2, 1). Suppose instead that the observer stepped back one unit along the x axis. What would be the apparent coordinates of P with respect to the observer?	2	Apply	Medium	No	Transformation	Clipping	2	6
13	Find the instance transformation which places a half size copy of the square A(0, 0), B(1, 0), C(1, 1) and D(0, 1) into a master picture coordinate system so that the centre of the square is at (-1, -1).	2	Remember	Low	No	Transformation	Window coordinate	2	2
14	Find the mirror image of the triangle ABC about y=x axis with the help of matrices. What do you understand by homogeneous coordinates?	2	Remember	Low	No	Transformation	Basic transformation	2	2
15	What do you understand by clipping, windowing and viewport?	2	Understand	Medium	No	Transformation	Basic transformation	2	6
16	Explain the procedure to convert the normalized device coordinate to the device coordinate used by the output device.	2	Analyze	Medium	Yes (UGC NET)	Transformation	Basic transformation	2	6
17	Rotate a triangle ABC with vertices A(2, 3, 1), B(3, 4, 5) and C(5, 6, 7) about a line Y = 2	2	Understand	Medium	No	Transformation	Window coordinate	2	6
18	Scale the surface A(2, 2, 2), B(4, 4, 4), C(5, 5, 5), D(6, 6, 6) with respect to point (7, 7)	2	Evaluate	High	No	Transformation	Composite Translation	2	10
19	Derive the general perspective termination onto a plane with reference point $R_0(x_0,y_0,z_0)$, normal vector $N=n_1l+n_2j+n_3K$, using C(a,b,c) as the centre of projection.	2	Apply	Medium	No	Transformation	Basic transformation	2	2
20	Prove that rotation followed by translation is not same as translation followed by rotation in three dimension	2	Apply	Medium	Yes (UGC NET)	Transformation	Composite Translation	2	6
21	Derive transformation matrix for rotation about a line parallel to one of the principle axis in space.	2	Apply	Medium	Yes (UGC NET)	Transformation	Composite Translation	2	6
22	Prove two translations are additive	2	Analyze	High	No	Transformation	Composite	2	10

							Translation		
23	Prove two Rotation are additive	2	Analyze	High	No	Transformation	Composite Translation	2	9
24	Prove two Scaling are multiplication	2	Remember	Low	Yes (UGC NET)	Transformation	Clipping	2	6
25	How will you clip a point?	2	Apply	Medium	No	Transformation	Clipping	2	6
26	What is the use of clipping?	2	Remember	Low	No	Transformation	Composite Translation	2	2
27	What is the relationship between the rotations R^{e}, $R\text{-}^{e}$, R^{e}-1?	2	Understand	Medium	No	Transformation	Clipping	2	6
28	Why line clipping algorithms are not use for clipping a polygon on line to line basis?	2	Understand	Medium	Yes (UGC NET)	Transformation	Basic transformation	2	6
29	Find the transformation A which aligns a given vector V with the vector K along the positive z-axis.	2	Understand	Medium	Yes (UGC NET)	Transformation	Homogeneous Coordinate	2	6
30	Find out the conditions under which scaling and rotation forms a commutative pair of operations.	2	Understand	Medium	Yes (UGC NET)	Transformation	Clipping	2	6
31	Define homogeneous coordinates. Mention the role do they play in composite transformations?	2	Remember	Low	No	Transformation	Homogeneous Transformation	2	2
32	Application program often use floating point numbers to define picture, whereas the display uses integers. Should the conversion from floating point to integer format be done before or after clipping? How?	2	Understand	Medium	No	Transformation	Clipping	2	2
33	Write the three dimensional homogeneous transformation matrix for scale z to double of its size.	2	Understand	Medium	No	Transformation	Homogeneous Representation	2	2
34	Find the form of transformation matrix for reflection about a line L with slope m and y-intercept (0, b)	2	Evaluate	High	No	Transformation	Basic Transformation	2	9
35	Find out the conditions under which scaling and rotation forms a commutative pair of operations.	2	Apply	Medium	No	Transformation	Composite Translation	2	6
36	A mirror is placed vertically such that it passes through the points (10, 0) and (0, 10). Fin the reflected view of a triangle ABC with co ordinates A(5, 50), B(20,40), C(10,70).	2	Apply	Medium	Yes (UGC NET)	Transformation	Composite Translation	2	2
37	Derive the transformation matrices for Reflection about line Y=-X,	2	Understand	Medium	Yes (UGC	Transformation	Composite Translation	2	6

	X=Y.				NET)				
38	Give the transformation matrix for rotating a point P(x,y), about x-axis by 90 degrees.	2	Remember	Low	No	Transformation	Composite Translation	2	2
39	Calculate the new position vector by Applying a translation in the xyz direction by -2, -4 and -6 respectively on the homogeneous coordinate position vector [1,6,4].	2	Understand	Medium	No	Transformation	Basic Transformation	2	2
40	Give a clipping window A(20, 20), B(60, 20), C(60, 40) and D(20, 40) using Cohen Sutherland algorithm find the visibe portion of the line segment joining the point P(40, 80) Q(120, 30).	2	Apply	Medium	No	Transformation	Basic Transformation	2	6
41	Consider the triangle A(4, 1), B(5, 2), C(4, 3). Rotate it by ann angle 90 degrees about a point A. Give the coordinates of the rotated triangle.	2	Understand	Low	Yes (UGC NET)	Transformation	Basic Transformation	2	2
42	Consider a line AD with coordinates A(1, 1) an B(10, 10). Refect the line about Y axis and then about the line Y=-X. Let this be case 1. In case 2 simply rotate the line by -270 degrees. Prove that the transformed object in both the cases is same.	2	Evaluating	High	No	Transformation	Basic Transformation	2	10
43	Rotate the point P(2, -4) about the origin 30 degrees in anti clockwise direction.	2	Remember	Low	No	Transformation	Composite Transformation	2	2
44	Derive the matrix representation of composite transformation.	2	Remember	Low	No	Transformation	Clipping	2	2
45	A polygon has four vertices locate at A(20, 10), B(60, 10) C(60, 30) and D(20, 30). Calculate the vertices after Applying a transformation matrix to double the size of polygon with point A located on the same place.	2	Understand	Low	No	Transformation	Basic Transformation	2	2
46	Explain the method to rotate an object about an axis that is not parallel to the coordinate axis with neat block diagram and derive the transformation matrix for the same.	2	Understand	Low	Yes (UGC NET)	Transformation	Basic Transformation	2	2
47	Explain about composite transformation in general and explain the two successive translation	2	Understand	Low	No	Transformation	Composite Transformation	2	2
48	Explain about composite transformation in general and explain the two successive Rotation	2	Understand	Medium	Yes (UGC NET)	Transformation	Composite Transformation	2	6
49	Explain about composite transformation in general and explain the two successive Scaling	2	Understand	Medium	No	Transformation	Composite Transformation	2	6
50	Explain about composite transformation in general and explain the	2	Understand	Medium	No	Transformation	Composite Transformation	2	6

	general pivot point rotation								
51	Explain about composite transformation in general and explain the general fixed point scaling	2	Understand	Low	No	Transformation	Composite Transformation	2	6
52	Find the reflection of a triangle defined by the vertices A(1,1), B(5,1) and C(1,5) about a line y=2x+10.	1	Apply	Medium	No	Introduction	Circle Algorithm	1	6

UNIT – III THREE DIMENSIONAL

S. No.	Questions	CO	Bloom's Taxonomy Level	Difficulty Level	Competitive Exam Question Y/N	Area	Topic	Unit	Mark
1	Explain in detail about three dimensional display methods.	3	Understand	Medium	No	3D	3D Display	3	6
2	Explain in detail about the boundary representation of three dimensional objects.	3	Understand	Low	No	3D	Object Representation	3	6
3	Explain in detail about the three dimensional transformations.	3	Understand	Low	No	3D	Transformation	3	6
4	Explain in detail about 3D window to viewport coordinate transformation.	3	Understand	Medium	No	3D	Projection	3	6
5	List the various representation schemes used in three dimensional objects?	3	Understand	Medium	Yes (UGC NET)	3D	Object representation	3	6
6	Write short notes on rendering bi-cubic surface patches of constant u and v method.	3	Understand	Medium	No	3D	Object representation	3	6
7	What are the steps involved in 3D transformation?	3	Understand	High	No	3D	Object representation	3	10
8	Write about view distance?	3	Understand	Medium	No	3D	Object representation	3	2
9	What you mean by parallel projection?	3	Understand	Medium	Yes (UGC NET)	3D	Object representation	3	6

10	Define Perspective projection?	3	Apply	Medium	Yes (UGC NET)	3D	Object representation	3	6
11	Define Projection reference point?	3	Apply	Medium	No	3D	Object representation	3	2
12	Define the use of Projection reference point?	3	Apply	Medium	No	3D	Object representation	3	2
13	List the different types of parallel projections?	3	Remember	Low	No	3D	Object representation	3	2
14	Define orthographic parallel projection?	3	Remember	Low	No	3D	Object representation	3	2
15	Define orthographic oblique projection?	3	Understand	Medium	No	3D	Object representation	3	2
16	Define an axonometric orthographic projection?	3	Analyze	Medium	Yes (UGC NET)	3D	V Object representation	3	2
17	Define cavalier projection?	3	Understand	Medium	No	3D	V Object representation	3	2
18	Define cabinet projection?	3	Evaluate	High	No	3D	Object representation	3	2
19	Define vanishing point?	3	Apply	Medium	No	3D	Object representation	3	2
20	Define principle vanishing point.	3	Apply	Medium	Yes (UGC NET)	3D	Object representation	3	2
21	Define view reference point?	3	Apply	Medium	Yes (UGC NET)	3D	Object representation	3	2
22	Define Projection.	3	Analyze	High	No	3D	Object representation	3	2
23	Briefly explain about the basic transformations performed on three dimensional objects.	3	Analyze	High	No	3D	Projection	3	8
24	Write short notes on parallel and perspective projections.	3	Remember	Low	Yes (UGC NET)	3D	Projection	3	2
25	Derive the 3D transformation matrix for rotating an object by an angle in the direction of Y Z plane.	3	Apply	Medium	No	3D	Projection	3	6
26	Derive transformation matrix for 3D scaling folLowed by rotation about fixed point	3	Remember	Low	No	3D	Projection	3	2
27	Define isometric projection in 3D graphics	3	Understand	Medium	No	3D	Projection	3	6
28	Explain the terms projection plan, view volume with references to 3D	3	Understand	Medium	Yes	3D	Projection	3	6

	graphics, State and explain the anomalies of perspective projection.				(UGC NET)				
29	How can the effect of aliasing be minimized?	3	Understand	Medium	Yes (UGC NET)	3D	Projection	3	6
30	Determine the 3D transformation matrices to scale a line PQ in the x direction by 3 by keeping point P fixed. To rotate this line by 45 degree anti-clockwise about the Z axis. Give P(1, 5, 2) and Q(4, 5, 6).	3	Understand	Medium	Yes (UGC NET)	3D	Projection	3	6
31	Explain different 3D object representation in detail.	3	Remember	Low	No	3D	Projection	3	10
32	Derive the 3D transformation matrix for rotation on an arbitrary axis.	3	Understand	Medium	No	3D	Projection	3	2
33	Derive the 3D transformation matrix for rotation on an arbitrary plane.	3	Understand	Medium	No	3D	Projection	3	2
34	What do you meant Blobby object?	3	Unerstand	High	No	3D	Projection	3	4
35	Define Octrees	3	Apply	Medium	No	3D	Projection	3	6
36	Distinguish between convex and concave polygons	3	Apply	Medium	Yes (UGC NET)	3D	Projection	3	2
37	Determine the projected image on the xy plane of a tetrahedron ABCD= $\begin{matrix}1 & 0 & 0 & 1\\ 0 & 1 & 0 & 1\\ 0 & 0 & 1 & 1\\ 1 & 1 & 1 & 1\end{matrix}$ using standard single point perspective transformation. The distance of the vanishing point P on the view plane may be taken as 5 units.	3	Understand	Medium	Yes (UGC NET)	3D	Projection	3	6
38	Set up a procedure for establishing polygon tables for any input set of data points defining an object.	3	Remember	Low	No	3D	Projection	3	2
39	Given the plane parameters B, B, C, and D for all surfaces of an object, devise an algorithm to determine whether any specified point is inside or outside the object.	3	Understand	Medium	No	3D	Projection	3	2
40	How would the values for parameters A, B, C, and D in the equation of a plane surface have to be altered if the coordinate reference is changed from a right handed system to a left-handed system?	3	Apply	Medium	No	3D	Object representation	3	10
41	Prove that the multiplication of three dimensional transformation matrices for each of the folLowing sequence of operations is commutative	3	Understand	Low	Yes (UGC NET)	3D	Object representation	3	10

42	a) Any two successive translations.	3	Evaluating	High	No	3D	Object representation	3	10
43	b) Any two successive scaling operations.	3	Remember	Low	No	3D	Object representation	3	10
44	c) Any two successive rotations about any one of the coordinate axes	3	Remember	Low	No	3D	Transformation	3	10
45	Derive the transformation matrix for scaling an object by a scaling factor s in a direction defined by the direction angles α, β, γ.	3	Understand	Low	No	3D	Transformation	3	2
46	Discuss a procedure for rotating an object that is represented in an octree structure.	3	Understand	Low	Yes (UGC NET)	3D	Transformation	3	4
47	Develop a procedure to converting an object defined in one coordinate reference to anv other coordinate system defined device to the first system.	3	Understand	Low	No	3D	Transformation	3	8
48	Show that the Rotation matrix is equal to the composite matrix $R_y(\beta).R_x(\alpha)$	3	Understand	Medium	Yes (UGC NET)	3D	Transformation	3	6
49	Write a procedure to perform a one-point perspective projection of an object.	3	Understand	Medium	No	3D	Transformation	3	6
50	Write a procedure to perform a two-point perspective projection of an object.	3	Understand	Medium	No	3D	Transformation	3	6
51	Extend the Sutherland-Hodgeman polygon clipping algorithm to clip three dimensional planes against a regular parallelepiped.	3	Understand	Low	No	3D	Transformation	3	6
52	Devise an algorithm to clip objects in a scene against a defined frustum. Compare the operations needed in this algorithm to those needed In an algorithm that clips against a regular parallel piped	3	Remember	Low	No	3D	Transformation	3	10
53	Modify the two-dimensional Liang-Barsky line-clipping algorithm to clip a given polyhedron against a specified regular parallelepiped	3	Understand	Medium	No	3D	Transformation	3	8

UNIT – IV CURVES AND SURFACES

S. No.	Questions	CO	Bloom's Taxonomy Level	Difficulty Level	Competitive Exam Question Y/N	Area	Topic	Unit	Mark
1	Define Polygon mesh?	4	Analyze	Medium	Yes (UGC NET)	Curves and Surface	Illumination	4	6
2	Define Bezier Basis Function?	4	Understand	Medium	No	Curves and Surface	Illumination	4	6
3	Define surface patch?	4	Evaluate	High	No	Curves and Surface	Illumination	4	10
4	Write the advantages of rendering polygons by scan line method?	4	Apply	Medium	No	Curves and Surface	Illumination	4	2
5	Write the advantages of rendering by patch splitting?	4	Apply	Medium	Yes (UGC NET)	Curves and Surface	Illumination	4	6
6	Define B-Spline curve.	4	Apply	Medium	Yes (UGC NET)	Curves and Surface	Representation	4	6
7	Define spline?	4	Analyze	High	No	Curves and Surface	Illumination	4	10
8	Write the use of control points?	4	Analyze	High	No	Curves and Surface	Illumination	4	9
9	List different ways of specifying spline curve?	4	Remember	Low	Yes (UGC NET)	Curves and Surface	Illumination	4	2
10	List the important properties of Bezier Curve?	4	Apply	Medium	No	Curves and Surface	Illumination	4	6
11	Differentiate between interpolation spline and approximation spline.	4	Remember	Low	No	Curves and Surface	Illumination	4	2
12	Write about parabolic splines?	4	Understand	Medium	No	Curves and Surface	Illumination	4	6
13	Define cubic spline?	4	Understand	Medium	Yes (UGC NET)	Curves and Surface	Illumination	4	6
14	Explain spline representation	4	Understand	Medium	Yes (UGC NET)	Curves and Surface	Illumination	4	6
15	Define an efficient polygon representation for the cylinder. Justify your choice of the representation.	4	Analyze	Medium	Yes (UGC NET)	Curves and Surface	Representation	4	6
16	What do you mean by convex hull property of Bezier curves?	4	Understand	Medium	No	Curves and Surface	Representation	4	6
17	Find the equation of the bazier curve which passes through (0,0) and (-	4	Understand	Medium	No	Curves and Surface	Representation	4	6

	4,2) and controlled through (14,10) and (4,0)								
18	Find the points on the Bezier curve which has starting and ending points P_0(2, 3) and P_3(4, -3) and controlled by P_1(5, 6) and P_2(7, 1) for u=0.9.	4	Evaluate	High	No	Curves and Surface	Representation	4	10
19	Show that the Bezier curve always touches the starting point (for u=0) and the ending point (for u=1).	4	Apply	Medium	No	Curves and Surface	Light	4	2
20	Give a detailed note on the ways in which motion of object can be specified in an animation system.	4	Apply	Medium	Yes (UGC NET)	Curves and Surface	Light	4	6
21	What is a Koch curve?	4	Apply	Medium	Yes (UGC NET)	Curves and Surface	Light	4	6
22	What is CSG technique?	4	Analyze	High	No	Curves and Surface	Light	4	10
23	Determine the blending function for uniform periodic B-spline curve for n=4, d=4.	4	Analyze	High	No	Curves and Surface	curve	4	9
24	Explain in detail about quadric surface.	4	Remember	Low	Yes (UGC NET)	Curves and Surface	Curve	4	2
25	Deflne an efficient polygon representation for a cylinder. justify your choice of representation.	4	Apply	Medium	No	Curves and Surface	Curve	4	2
26	Se: up an algorithm for converting any specified sphere, ellipsoid, or cylinder to a polygon-mesh representation	4	Remember	Low	No	Curves and Surface	Curve	4	2
27	Write a routine to display a two-dimensional, cardinal-spline curve, given an input set of control points in the xy plane.	4	Understand	Medium	No	Curves and Surface	Spline	4	6
28	Determine the quadratic Bazier blending functions for three control points. Plot each function and label the maximum and minimum values	4	Understand	Medium	Yes (UGC NET)	Curves and Surface	Spline	4	6
29	Determine the Bezier blending functions for five control points. Plot each function and label the maximum and minimum values.	4	Understand	Medium	Yes (UGC NET)	Curves and Surface	B spline	4	6
30	Write an efficient routine to display two-dimensional, cubic Bezier curves, given a set of four control points in the xy plane.	4	Understand	Medium	Yes (UGC NET)	Curves and Surface	B spline	4	6
31	Determine the blending functions for uniform, periodic B-spline curves for d = 5.	4	Remember	Low	No	Curves and Surface	BSpline	4	2
32	Determine the blending functions for uniform, periodic B-spline curves for d = 6.	4	Understand	Medium	No	Curves and Surface	B Spline	4	2
33	Explain a cubic Bezier curve using a subdivision method	4	Understand	Medium	No	Curves and Surface	Spline	4	2
34	Write a Procedure to display any specified conic in the xy plane using a rational Bazier-spline representation	4	Evaluate	High	No	Curves and Surface	Spline	4	9

35	Set up an algorithm for loading a quadtree representation of a scene into a frame buffer for display of the scene.	4	Apply	Medium	No	Curves and Surface	Polygon Representation	4	6
36	Develop an algorithm for performing constructive solid-geometry modeling using a primitive set of solids defined in octree structures	4	Apply	Medium	Yes (UGC NET)	Curves and Surface	Blobby Object	4	2
37	Develop procedure for generating the description o i .3 three-dimensional object using input parameters that define the object in terms of a rotational sweep.	4	Understand	Medium	Yes (UGC NET)	Curves and Surface	Polygon Representation	4	6
38	Develop an algorithm for encoding a two-dimensional scene as a quadtree representation.	4	Remember	Low	No	Curves and Surface	Blobby Object	4	2
39	Using the random, midpoint-displacement method, write J routine to create a mountain outline starting with a horizontal line in the xy plane	4	Understand	Medium	No	Curves and Surface	Polygon Representation	4	2
40	Write a procedure to interactively select different color combinations for displaying the Mandelbrot set.	4	Apply	Medium	No	Curves and Surface	Blobby Object	4	6

UNIT – V SURFACE DETECTION & ILLUMINATION MODEL

S No.	Questions	CO	Bloom's Taxonomy Level	Difficulty Level	Competitive Exam Question Y/N	Area	Topic	Unit	Mark
1	Mention some surface detection methods.	5	Understand	Medium	No	Graphics	Shadow	5	6
2	What is tweening?	5	Evaluate	High	No	Graphics	Shadow	5	10
3	Discuss on Grammar based models in detail.	5	Apply	Medium	No	Graphics	Shadow	5	2
4	What do you mean by shading of objects?	5	Apply	Medium	Yes (UGC NET)	Graphics	Shadow	5	6
5	List the properties of light?	5	Apply	Medium	Yes (UGC NET)	Graphics	Shadow	5	6
6	What are the types of reflection of incident light?	5	Analyze	High	No	Graphics	Shadow	5	10
7	Define rendering	5	Analyze	High	No	Graphics	Surface Detection	5	2
8	Differentiate flat and smooth shading	5	Analyze	High	No	Graphics	Surface Detection	5	9
9	What is a shadow?	5	Remember	Low	Yes (UGC NET)	Graphics	Surface Detection	5	2
10	What are two methods for computing shadows?	5	Apply	Medium	No	Graphics	Surface Detection	5	6
11	Write any two Drawbacks of Phong Shading	5	Remember	Low	No	Graphics	Surface Detection	5	2
12	What are the two common sources of textures?	5	Understand	Medium	No	Graphics	Surface Detection	5	6
13	Write two types of smooth shading.	5	Understand	Medium	Yes (UGC NET)	Graphics	Surface Detection	5	6
14	Develop a procedure, based on a back-face detection technique, for identifying all the visible faces of a convex polyhedron that has different-colored surfaces. Assume that the object is defined in a right-handed viewing	5	Understand	Medium	Yes (UGC NET)	Graphics	Surface Detection	5	6

	system with the xy-plane as the viewing surface.								
15	Implement a back-face detection p r ~ e d u r eus ing an orthographic parallel projection to view visible faces of a convex polyhedron. Assume that all parts of the object are in front of the view plane, and provide a mapping onto a screen viewport for display.	5	Analyze	Medium	Yes (UGC NET)	Graphics	Surface Detection	5	6
16	Implement a back-face detection procedure using a perspective projection to view visible faces of a convex polyhedron. Assume that all parts of the object are in front of the view plane, and provide a mapping onto a screen viewport for display.	5	Understand	Medium	No	Graphics	Surface Detection	5	6
17	Implement the depth-buffer method to display the visible surfaces of a given polyhedron.	5	Understand	Medium	No	Graphics	Surface Detection	5	6
18	How can the storage requirements for the depth buffer bedetermined from the definition of the objects to be displayed?	5	Evaluate	High	No	Graphics	Surface Detection	5	10
19	Implement the depth-buffer method to display the visible surfaces in a scene containing any number of polyhedrons. Set up efficient methods for storing and processing the various objects in the scene.	5	Apply	Medium	No	Graphics	Surface Detection	5	2
20	Implement the A-buffer algorithm to display a scene containing both opaque and transparent surfaces. As an optional feature, you[algorithm may be extended to include antialiasing.	5	Apply	Medium	Yes (UGC NET)	Graphics	Surface Detection	5	6
21	Develop a depth-sorting program to display the visible surfaces in a scene containing several polyhedrons.	5	Apply	Medium	Yes (UGC NET)	Graphics	Surface Detection	5	6
22	Discuss how antialiasing methods can be incorporated into the various hidden-surface elimination algorithms.	5	Analyze	High	No	Graphics	Surface Detection	5	10
23	Devise an algorithm for viewing a single sphere using the ray-casting method.	5	Analyze	High	No	Graphics	Surface Detection	5	9
24	Discuss how wireframe displays might be generated with the various visible-	5	Remember	Low	Yes (UGC NET)	Graphics	Surface Detection	5	2

	surface detection methods discussed in this chapter.								
25	Write a procedure to render a polygon interface mesh using Phong shading	5	Apply	Medium	No	Graphics	Surface Detection	5	6
26	Discuss how different visible surface methods can be combined with intensity model for displaying a set of polyhedrons with opaque surface.	5	Remember	Low	No	Graphics	Color Consieration	5	2
27	Define intensity of light.	5	Understand	Medium	No	Graphics	Illumination	5	6
28	Explain about shading and graphics pipeline.	5	Understand	Medium	Yes (UGC NET)	Graphics	Illumination	5	6
29	Compare Flat shading and Smooth shading.	5	Understand	Medium	Yes (UGC NET)	Graphics	Illumination	5	6
30	Explain Gouraud shading and Phong shading.	5	Understand	Medium	Yes (UGC NET)	Graphics	Light	5	6
31	Explain Back face detection method and Depth buffer method	5	Remember	Low	No	Graphics	Light	5	2
32	Explain area subdivision and A- Buffer method	5	Understand	Medium	No	Graphics	Light	5	2
33	Define frame.	5	Understand	Medium	No	Graphics	Light	5	2
34	What is computer graphics realism?	5	Evaluate	High	No	Graphics	Specular reflection	5	9
35	How realistic pictures are created in computer graphics?	5	Apply	Medium	No	Graphics	Specular reflection	5	6
36	Define Fractals and Koch curve?	5	Apply	Medium	Yes (UGC NET)	Graphics	Scan method	5	2
37	Give an account about Peano curves.	5	Understand	Medium	Yes (UGC NET)	Graphics	Scan method	5	6
38	Explain the methods for crating images by means of iterated function systems.	5	Remember	Low	No	Graphics	Scan method	5	2
39	Explain about the Mandelbrot set and Julia sets	5	Understand	Medium	No	Graphics	Hidden surface detection	5	2
40	Explain about reflections and transparency.	5	Apply	Medium	No	Graphics	Hidden surface detection	5	6
41	Explain the Boolean operations that can be performed on objects.	5	Understand	Low	Yes (UGC NET)	Graphics	Hidden surface detection	5	2
42	Describe the different techniques used in the animation control mechanisms	5	Evaluating	High	No	Graphics	Back face detection	5	10
43	Explain: (A). Standard motions in key frame animation, (B)Image synthesis	5	Remember	Low	No	Graphics	Back face detection	5	2

44	What is meant by diffuse and specular reflection?	5	Understand	Medium	No	Graphics	Back face detection	5	2
45	Explain Gourard method for shading.	5	Understand	Medium	No	Graphics	Back face detection	5	2
46	Describe in detail z-buffer algorithm for visible surface detection.	5	Understand	Medium	No	Graphics	Back face detection	5	6
47	Explain depth buffer algorithm for hidden surface removal in three dimensional objects.	5	Understand	Medium	Yes (UGC NET)	Graphics	Back face detection	5	6
48	Discuss the various animation techniques in detail with example for each.	5	Understand	Medium	Yes (UGC NET)	Graphics	Back face detection	5	6
49	Which shading model do you use to render shiny plastic or glass objects? Why?	5	Analyze	Medium	Yes (UGC NET)	Graphics	Back face detection	5	6
50	How can you improve the realism of objects using reflection mapping technique?	5	Understand	Medium	No	Graphics	Back face detection	5	6
51	Explain the process of adding image texture onto surfaces.	5	Understand	Medium	No	Graphics	Hidden surface detection	5	2
52	Explain in detail about the properties of light and draw chromaticity diagram.	5	Apply	Medium	No	Graphics	Hidden surface detection	5	6
53	Describe the process of Ray Tracing. Explain how it is used to create Reflection and Transparency.	5	Understand	Low	Yes (UGC NET)	Graphics	Hidden surface detection	5	2
54	Explain the vector interpolation techniques used by phong shading model.	5	Evaluating	High	No	Graphics	Back face detection	5	10

External Expert:

Dr. Naveen Kumar,
Professor,
IGNOU,
Contact: +09716518686,
E-Mail: *naveenkumar@gmail.com*

Appendix II

Bloom's Taxonomy Levels Distribution of Questions in Question Bank

School of Computing Science and Engineering

Date: 09 Jan 2019 **Course Name:** Computer Graphics **Course Code:** CSE323

Serial No.	Bloom's Taxonomy Level	Percentage Distribution
1	Knowledge	34%
2	Understand	22%

3	Apply	9%
4	Analysis	20%
5	Evaluate	5%
6	Create	10%

Signature of Course Coordinator/DC:

Signature of Dean:

IQAC:

Appendix III

Difficulty Levels Distribution of Questions in Question Bank

School of Computing Science and Engineering

Date **:** 09 Jan 2019 **Programme / Sem** **:** B.Tech / III Yr / VI Sem

Course Name : Computer Graphics **Course Code** **:** CSE323

Serial No.	**Difficulty Level**	**Percentage Distribution**

1	Low	26%
2	Medium	60%
3	High	14%

Signature of Course Coordinator/DC:

Signature of Dean:

IQAC: