Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: CS401

Course Name: COMPUTER GRAPHICS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks.

		Marks
1	Suppose you have a raster system designed using an 8 inches × 10 inches screen with a resolution of 100 pixels per inch in each direction. What frame buffer size is required if 6 bits are stored per pixel in the buffer?	(4)
2	Write the midpoint circle drawing algorithm.	(4)
3	a) List the advantages of using Bresenham's line drawing algorithm.	(2)
	b) What is the purpose of a frame buffer in a display system?	(2)
4	How does Cohen Sutherland algorithm determine whether a line is visible, invisible or a candidate for clipping based on the region codes assigned to the end points of the line?	(4)
5	A triangle ABC with coordinates A(0,0), B(6,5), C(6,0) is scaled with scaling factors Sx=2 and Sy=3 about the vertex C(6,0). Find the transformed coordinate points.	(4)
6	Write the 3D translation matrix for moving an object by -2 units, -4 units and -6 units respectively in x, y and z directions.	(4)
7	Describe Histogram and also the type of information which obtained from a gray level histogram	(4)
8	Briefly describe the various classification of the visible–surface detection algorithms.	(4)
9	Is there any point at which a set of projected parallel lines appears to converge? Justify your answer.	(4)
10	What is edge detection? Explain any one edge detection technique in digital image processing.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11	a)	Describe in detail about emissive and non-emissive flat panel displays.	(5)

b) Explain the working principle of a Refresh CRT monitor with suitable diagrams. (4)

12 a) Write the boundary fill algorithm for filling a polygon using eight connected approach. (4)

b) Use mid-point circle drawing algorithm to plot a circle whose radius =20 units and centre at (50,30). (5)

13 a) Write a note on any two interactive graphics input devices. (3)

b) Scan convert the line segment with end points (30,20) and (15,10) using DDA line drawing algorithm (4)

c) What are the advantages and disadvantages of DDA line drawing algorithm (2)

PART C

Answer any two full questions, each carries 9 marks.

14 a) Perform a 45 degree rotation of a triangle ABC having the vertices at A(0,0) B(10,10) and C(50,20) (6)

i. About the origin

ii. About an arbitrary point P(-10,-10)

b) Describe the tables used to represent a polygon surface. (3)

15 a) Explain the window to viewport coordinate transformation and also derive the scaling factors during the transformation. (5)

b) Show that the composition of two rotation is additive by concatenating the matrix representation for R(Θ1) and R(Θ2) (4)

16 a) Show that transformation matrix for a reflection about the line y=x is equivalent to a reflection relative to the x axis followed by a counter clockwise rotation of 90 degree. (4)

b) Write Weiler – Atherton polygon clipping algorithm with suitable example. (5)

PART D

Answer any two full questions, each carries 12 marks.

17 a) Compare object space and image space method of visible surface detection technique. (3)

b) Describe in detail the depth buffer visible surface detection technique. Derive the equation to find the depth values for a surface position (x, y). (9)

18 a) What is mean by convolution? Give applications of 2D convolution in the field of image processing. (4)

b) Distinguish between cavalier and cabinet projection. (4)

c) Explain scan line algorithm with suitable example. (4)

19 a) What is parallel projection? Describe orthographic and oblique parallel projection in detail. (6)

b) Consider the image segment shown below. (6)

	3	1	2	**1** **(q)**
	2	2	0	2
	1	2	1	1
(p)	**1**	0	1	2

i) Compute the lengths of shortest 4, shortest 8 and shortest m paths between pixels p and q where V={0,1}. If a particular path does not exist between these two points, explain why.

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