Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S,FE) Examination December 2025 (2019 Scheme)

Course Code: AIT322

Course Name: CONCEPTS IN COMPUTER GRAPHICS AND IMAGE PROCESSING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1		Compare DDA and Bresenham's line drawing algorithm.	(3)
2		List out the applications of Computer Graphics.	(3)
3		Write down 4-neighbour Boundary Filling algorithm.	(3)
4		Discuss on Homogeneous coordinate system and specify one significance.	(3)
5		Derive the equation for Window to Viewport transformation.	(3)
6		Explain the Cohen Sutherland line clipping algorithm with a suitable example.	(3)
7		Explain Sampling and Quantization.	(3)
8		Find the number of bits required to store a 128 x 128 image with 256 gray levels.	(3)
9		Compare Smoothening and Sharpening in Image Processing.	(3)
10		What is the Histogram of an image? Explain the significance of the Histogram.	(3)

PART B

Answer one question from each module, each carries 14 marks.

Module I

11	a)	Describe the working principle of a Refresh CRT monitor with suitable diagrams.	(8)
	b)	Calculate the points between the starting point (9,18) and ending point (14,22) using Bresenham's line drawing algorithm.	(6)

OR

12	a)	Differentiate Raster scan display with Random scan display.	(8)
	b)	Use the Mid-Point circle drawing algorithm to plot a circle whose radius is 10 and centre at (0,0).	(6)

Module II

13 a) Perform the following transformations on a line with end points A(3, 5) and B(6, 9). Also, plot original and resultant lines for each case. (8)

i) Translate two unit in x-direction and three units in y-direction.

ii) Rotate the object by 45 degrees counterclockwise about the origin.

b) Compare the procedures of Flood Fill and Boundary Fill Algorithm. (6)

OR

14 a) Explain the Scan line polygon filling algorithm and the data structures used. (8)

b) Compare Scaling and Shearing operations in 2D Transformations. (6)

Module III

15 a) Discuss the steps in 2D Viewing Pipeline with the help of a diagram. (8)

b) Explain the Sutherland-Hodgeman Polygon clipping algorithm with an example. (6)

OR

16 a) Distinguish between Parallel and Perspective Projections. (8)

b) Show how intersection points are calculated with clipping window boundary in Cohen Sutherland line clipping algorithm. (6)

Module IV

17 a) Explain the Fundamental steps in Digital Image Processing. (8)

b) What are the advantages and disadvantages of Digital Image Processing? (6)

OR

18 a) With the help of a diagram, explain the components of an Image Processing System. (6)

b) Compute the length of shortest 4,8 and, m-path between pixels p and q in the given figure where V={0,1}. If a particular path does not exist between these pixels, write suitable justification. (8)

Repeat computations using V:{1,2}.

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

Module V

19 a) Define Image Segmentation. Discuss on any three thresholding methods used for segmentation. (8)

b) Explain the Prewitt and Sobel edge detectors. (6)

OR

20 a) Apply Histogram equalization of the following image (8)

1	2	1	1	1
2	5	3	5	2
2	5	5	5	2
2	5	3	5	2
1	1	1	2	1

b) Compare and contrast linear and non-linear filters used in image processing. (6)

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