Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Seventh Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

Course Code: CS401
Course Name: COMPUTER GRAPHICS

Max. Marks: 100   Duration: 3 Hours

PART A
Answer all questions, each carries 4 marks.   Marks

1	Describe simple raster scan system and draw its architecture.	(4)
2	Generate 4 pixel positions of a circle in the first quadrant with radius r=10 centered on the origin, using the midpoint circle algorithm.	(4)
3 (a)	Which algorithm is better for line drawing – DDA or Bresenham's? Defend your view.	(2)
(b)	Write a note on any two interactive graphics input devices.	(2)
4	Write 2D transformation matrix for reflection and rotation of an object about x-axis.	(4)
5	Write the A-buffer algorithm for visible surface detection.	(4)
6	Describe the various classifications of the visible–surface detection algorithms with example.	(4)
7	Describe the concept of vanishing point with relevant figures.	(4)
8	Distinguish between one point perspective projection and two point perspective projection with suitable diagram.	(4)
9	Illustrate scaling with respect to a selected fixed position (x_f, y_f, z_f)	(4)
10	Describe the concept of spatial convolution.	(4)

PART B
Answer any two full questions, each carries 9 marks.

11 a)	Consider three different raster systems with resolutions of 640 by 480, 1280 by 1024 and 2560 by 2048. What size frame buffer (in bytes) 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?	(5)
b)	Compare Boundary and flood fill algorithm.	(4)
12 a)	Explain the components and working of colour CRT with suitable diagrams.	(6)
b)	Indicate what raster locations would be chosen by Bresenham's algorithm while scan converting a line from (5, 5) to (13, 9).	(3)
13 a)	Mention the steps involved in the rotation of a 2D object about a selected pivot point.	(5)
b)	Cohen Sutherland algorithm can totally reject a line in the first step itself.Justify	(4)

PART C
Answer any two full questions, each carries 9 marks.

14 a) Use Cohen Sutherland algorithm to clip the line segment joining the points P(40,80) and Q(120,30) against a clipping window with corners at A(20,20), B(60,20), C(60,40) and D(20,40). (6)

b) Draw and explain the two dimensional viewing pipeline. (3)

15 a) A point (4,3) is rotated counter clockwise by an angle of 45^0. Find the rotation matrix and resultant point. (4)

b) Explain how polygon meshes are used for 3D modelling. (5)

16 a) Explain Weiler-Atherton polygon clipping with an example. (5)

b) Describe the methods to model quadric surfaces in 3D. (4)

PART D
Answer any two full questions, each carries 12 marks.

17 a) Derive the linear equation for a 3D object and test whether the coordinates are inside or outside the plane. (4)

b) Derive the transformation matrix for perspective projection with suitable diagram. (8)

18 a) Describe histogram equalisation and discuss the role of histogram equalisation in a digital image. (4)

b) With a suitable example explain the depth buffer algorithm for hidden surface elimination. (8)

19 a) Explain how edge detection is done using Robert, Prewitt, Sobel operators. (6)

b) Explain any 3 visible surface detection methods. (6)

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