Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019
Course Code: CS484
Course Name: COMPUTER GRAPHICS

Max. Marks: 100   Duration: 3 Hours

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

1	Explain the need of frame buffer in a graphics system? Consider a raster systems with resolution 1280 by 1024, what is the size of the frame buffer (in bytes) needed for the system to store 12 bits per pixel?	(4)
2	Explain the concept of interlaced refresh procedure. What is the advantage of using interlacing in display systems?	(4)
3	Why integer arithmetic is used in Bresenham's line drawing algorithm for the calculation of pixel values?	(4)
4	Write the transformation matrix in homogeneous form for reflection with reference to x axis and reflection with respect to line $y = x$.	(4)
5	Explain various steps to perform transformation from modelling coordinate system to device coordinate system.	(4)
6	Explain 4-connected boundary fill algorithm. Are there any demerits for this approach? Justify your answer.	(4)
7	Explain about different polygon tables used to represent polygon surfaces. Illustrate using necessary diagrams.	(4)
8	A homogenous coordinate point P(5,4,2) is translated in x,y and z direction by tx = -2, ty= -2 and tz = -2 unit respectively followed by successive rotation of 30 degree about z axis in counter clockwise direction . Find the final position of homogeneous coordinate.	(4)
9	Explain the concept of vanishing point in perspective projection?	(4)
10	How visible surface detection methods are classified?	(4)

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

11		Explain different processing units involved in Raster graphics systems.	(9)
12	a)	Derive the initial decision parameter of midpoint circle drawing algorithm.	(4)
	b)	Find the pixel position approximating the circle having centre (10,10) and radius of 5 units using midpoint circle drawing algorithm.	(5)

13   a)   Convert the line segment joining the points (0,0)and (16,18) using DDA algorithm.   (5)

      b)   Explain any four interactive input devices.   (4)

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

14   Explain Midpoint subdivision line clipping algorithm with an example.   (9)

15   a)   Find the transformed points of unit square with coordinates (0, 0), (1,0), (1,1) and(0,1) after shearing with shearing factor $Sh_x = 2$.   (4)

      b)   Translate the square ABCD whose coordinates are A(0,0), B(3,0), C(3,3) and D(0,3) by 2 in both directions and then scale it by 1.5 units in x direction and 0.5 units in y direction. Draw the resultant figure.   (5)

16   a)   Represent the following 2D transformations using homogeneous coordinates.   (5)

         i)   Translation

         ii)   Rotation with respect to origin

         iii)   Rotation with respect to pivot point

         iv)   Scaling with respect to origin

         v)   Scaling with respect to fixed point

      b)   Define window and viewport used in 2D viewing   (4)

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

17   a)   For the figure (Fig. 1) given below, determine the output vertices in each stage of the polygon after passing through the four clippers. Also, plot the polygon after each stage.   (4)
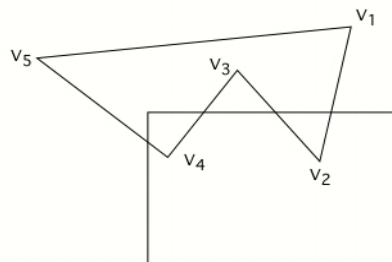

Fig 1: Input Polygon

      b)   Explain the working of Sutherland Hodgeman polygon clipping algorithm.   (8)

18   Explain the following algorithms for visible surface detection

      a)   Depth buffer algorithm   (6)

      b)   Scan line algorithm   (6)

19   a)   Explain perspective projection with proper illustrations.   (6)

      b)   Write the matrix representation of basic 3D transformations in homogeneous form.   (6)

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