## **Question Paper**

Exam Date & Time: 03-Jan-2023 (02:30 PM - 05:30 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

VII Semester Makeup Examination

**Computer Graphics and Animation [ICT 4301]** 

Marks: 50 Duration: 180 mins. **Descriptive Questions** Answer all the questions. Section Duration: 180 mins Prove that the initial decision parameter of the midpoint ellipse drawing algorithm is 1) (5) $P_0 = r_y^2 + \frac{r_x^2}{4} - r_y r_x^2$  for the region 1. A) A triangle with vertices (2,2), (0,0) and (2,0). Apply shearing factor 2 on x-axis and 2 on y-axis. Find (3) B) out the new coordinates of the triangle. C) Differentiate between traditional and computer animation techniques. (2)2) With the interpretation of each step output, clip the following polygon using the Sutherland (5) Hodgeman method. A) B) Find the transformation of the triangle with vertices A(1,0), B(0,1), C(1,1) by rotating 45 degree (3)about the origin and translating one unit in X and Y direction. C) Given a 3D triangle with points (0, 0, 0), (1, 1, 2) and (1, 1, 3). Apply shear parameter 2 on X axis (2)and find out the new coordinates of the object. Write an OpenGL program to draw line using DDA line drawing algorithm. (5) 3) A) B) Elucidate "squash and stretch" technique for emphasizing objectacceleration using bouncing-ball (3)illustration. C) Prove that two successive 2D scaling is multiplicative. (2)4) Determine the content of the active edge table to fill the polygon with vertices A(2,2), B(4,1) and (5)C(4,4). A) B) The two end point of the lines are  $(x_1,y_1) = (2,2)$  and  $(x_2,y_2) = (9,2)$ . Find the remaining points of the (3) given line using DDA line drawing algorithm.

	C)	Compare refresh type and storage type CRT (Cathode Ray Tube) display.	(2)
5)		Determine all the points of the circle having radius (r) = 4 and center (xc, yc) = $(2,3)$ , using Bresenham's circle drawing algorithm.	(5)
	A)		
	B)	WXYZ be the rectangle window with A(5,5), B(75,5), C(75,55) and D(5,55). Find the region codes for the endpoints & use Cohen Sutherland algorithm to clip the line P1P2 with P1(0,25), P2(55,75).	(3)
	C)	Draw the 3D viewing pipelines and compare how it is different from 2D viewing pipeline.	(2)

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