USN											21CST602

B.E. Degree(Autonomous)Sixth Semester End Examination (SEE),July/August 2024

Computer Graphics & Fundamentals of Image Processing

(Model Question Paper- II)

Time:3 Hours		MaximumMarks:100

Instructions to students

1. Answer FIVE FULL Questions.

Q. No.	Questions	Marks	CO	RBT Levels
1 (a)	Explain Random scan and Raster scan display system.	10	CO1	L2
1(b)	Write an algorithm of DDA Line drawing. Consider a line AB with A(0,0) and B(8,4). Apply a simple DDA to calculate the pixels of this line.	10	CO1	L3
	OR			
2 (a)	What are attribute functions? Explain OpenGL Point and Line -Attribute Functions with an example.	10	CO1	L2
2(b)	Write Bresenham's line drawing algorithm. For 10×10 frame buffer, interpret the Bresenham's algorithm to find which pixels are turned on for the line segment (1, 2) and (7, 6).	10	CO1	L3
3 (a)	Explain rotation in 2D.Show that two successive rotations are additive.	10	CO2	L2
3(b)	Obtain a matrix representation for rotation of a object about a specified pivot point in 2- dimension	06	CO2	L3
3 (c)	Explain OpenGL functions for Translation, Rotation, Scaling	04	CO2	L2
	OR			
4 (a)	Explain 3-D rotation. Give homogeneous matrix for the same	08	CO2	L2
4(b)	Prove the following 1) Two successive rotations are additive 2) Two successive translations are additive 3) Two successive scaling are multiplicative	12	CO2	L3
5 (a)	Explain how window events are recognized by GLUT. Give suitable example.	10	CO3	L4
5(b)	What are the features of a good interactive program? Explain.	10	CO3	L2
	OR			
6 (a)	What is computer animation? Explain the various stages in the development of animation sequences.	10	CO3	L2
6(b)	Write an OpenGL program to display square when a left button is pressed and to exit the program if right button is pressed.	10	CO3	L4

7 (a)	Explain the fundamental steps in image processing	**10**	**CO4**	**L2**
7(b)	Explain Digital image representation. Given a grey-scale image of size 5 inches by 6 inches scanned at the rate of 300 dpi, answer the following: (a) How many bits are required to represent the image? (b) How much time is required to transmit the image if the modem is 28 kbps? (c) Repeat (a) and (b) if it were a binary image.	**10**	**CO4**	**L2**
	OR			
8 (a)	. Describe the basic relationship between the pixels ➢ Neighbours of a pixel ➢ Connectivity ➢ Distance measures	**10**	**CO4**	**L2**
8(b)	Consider the following two images. Perform the arithmetic operations: addition, multiplication, division. Assume that all the operations are uint8. $f_1 = \begin{pmatrix} 10 & 40 & 30 \\ 40 & 100 & 90 \\ 90 & 80 & 70 \end{pmatrix}$ $f_2 = \begin{pmatrix} 40 & 140 & 90 \\ 140 & 100 & 90 \\ 90 & 80 & 190 \end{pmatrix}$	**10**	**CO4**	**L2**
9 (a)	Describe about the canny edge detector with necessary equation and also write its algorithm.	**12**	**CO5**	**L2**
9(b)	Define image segmentation formally and describe the characteristics of the segmentation process.	**08**	**CO5**	**L2**
	OR			
10 (a)	Write a python program to read an image and extract and display low-level features such as edges, textures using filtering techniques.	**10**	**CO5**	**L4**
10(b)	Explain the classification of various image segmentation algorithms and delineate their distinct types.	**10**	**CO5**	**L2**