

Model Question Paper-1/2 with effect from 2021(CBCS Scheme)

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Sixth Semester B.E. Degree Examination 21AI644

TIME: 03 Hours

Max. Marks: 100

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Define computer graphics? Explain coreapplications of computer graphics.	L2	CO1	10M
	b	Outline electrostatic deflection of of the electron beam in a CRT.	L2	CO1	10M
OR					
Q.02	A	Explain roster scan display with neat diagram.	L2	CO1	10M
	B	Demonstrate DDA algorithm with different cases.	L2	CO1	10M
Module-2					
Q. 03	A	Construct two dimensional geometric translation and notation equation.	L3	CO2	10M
	B	Demonstrate three dimensional coordinate lines rotation.	L2	CO2	10M
OR					
Q.04	A	Summarize function for two dimensional geometric transformations.	L2	CO2	10M
	B	Outline OpenGL Geometric transformation function.	L2	CO2	10M
Module-3					
Q. 05	A	Summarize logical classification of input device.	L2	CO3	10M
	B	Explain the OpenGL Menu functions.	L2	CO3	
OR					
Q. 06	A	Organize different interactive picture construction technique.	L3	CO3	10M
	B	Identify development stages for design of animation sequences.	L3	CO3	10M
Module-4					
Q. 07	A	Outline image processing and related fields.	L2	CO4	10M
	B	Apply image processing arithmetic operation to an example.	L3	CO4	10M
OR					
Q. 08	A	Briefly classify different types of Images.	L2	CO4	10M
	B	Organize an important characteristics of Images.	L3	CO4	10M
Module-5					
Q. 09	A	Rephrase formal definition Image segmentation.	L2	CO5	6M
	B	Summarize characteristics of the segmentation process.	L2	CO5	7M
	C	Explain canny-edge detection algorithm		CO5	7M
OR					
Q. 10	A	Classify Image Segmentation Algorithms.	L2	CO5	10M
	B	Demonstrate different stages in edge deletion.	L2	CO1	10M

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.

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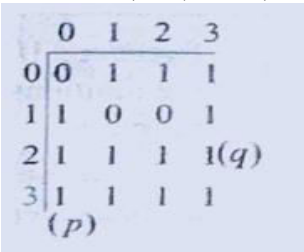
Sixth Semester B.E. Degree Examination Computer Graphics and Fundamentals of Image Processing

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Define Computer Graphics? Explain the application of Computer Graphics.	CL2	1	8
	b	Illustrate the Basic design and operation of Cathode Ray Tube with a neat diagram.	CL2	1	8
	c	List and Explain different Open GL Primitives giving example for each.	CL2	1	4
OR					
Q.02	a	Define DDA? Obtain Bresenham's Line drawing algorithm for $ m < 1.0$. Digitize the line using Bresenham's Line drawing algorithm with end points (20,10) and (30,18).	CL3	1	8
	b	Briefly explain Random and Raster Scan display based on Television Technology.	CL2	1	8
	c	Obtain OpenGL Point functions, line functions and its attributes.	CL3	1	4
Module-2					
Q.03	a	Illustrate the Basic 2D-Geometric transformations.	CL2	2	8
	b	Develop Composite homogeneous transformation matrix to rotate an object w.r.to pivot point for the triangle A (3, 2), B (6, 2), C (6,6). Rotate it in anticlockwise direction by 90° keeping A (3,2) fixed. Draw the new polygon.	CL3	2	8
	c	What are two entities required to perform a Rotation? Show that two successive rotations are additive.	CL3	2	4
OR					
Q.04	a	Explain the 3D Geometric Transformation Matrix for Rotation.	CL2	2	8
	b	Design Transformation matrix to rotate a 3D Object about an axis that is not parallel to one of the coordinate axes.	CL3	2	8
	c	Define Quaternion? How Quaternions are used in rotation in a three-dimensional space.	CL3	2	4
Module-3					
Q.05	a	Explain the different logical input devices and explain the different modes supported by input devices.	CL2	3	8
	b	Illustrate all the Open GL Interactive input device functions.	CL2	3	8

	c	Briefly explain Open GL Menu Functions.	CL2	3	4
OR					
Q.06	a	Illustrate Key Frame systems and explain Morphing with required equations.	CL2	3	8
	b	Explain in detail Character Animation with articulated figure animation and motion capture.	CL2	3	8
	c	Describe the basic approaches required for designing animation sequences.	CL2	3	4
Module-4					
Q.07	a	Define Image Processing? Explain the Nature of Image Processing in detail.	CL2	4	8
	b	Explain the classification on type of images with examples.	CL2	4	8
	c	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 the aforementioned if it were a binary image	CL3	4	4
OR					
Q.08	a	Describe Arithmetic operations used in processing the images.	CL2	4	8
	b	Explain in detail the Image Interpolation Techniques.	CL2	4	8
	c	Write a short note on the following a) Connectivity b) Distance Measures c) And Compute D_e , D_4 , D_8 and D_m distance between two pixels X and Y be (0, 0) and (6, 3) for the image below 	CL3	4	4
Module-5					
Q.09	a	Explain about classification of segmentation algorithms in detail with diagram?	CL2	5	8
	b	List and explain about different types of edge detections process with diagram.	CL2	5	8
	c	What is segmentation? Explain different characteristics of segmentation?	CL2	5	4
OR					
Q.10	a	Explain in detail about the Second order derivative filters.	CL2	5	8
	b	Explain canny edge detection algorithm in detail?	CL2	5	8
	c	Describe the template matching filters and its types.	CL2	5	4

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Sixth Semester B.E. Degree Examination

Computer Graphics And Fundamentals Of Image Processing

TIME: 03 Hours

Max. Marks: 100

Note: Answer any FIVE full questions, choosing at least ONE question from each MODULE.

Module -1			*Bloom's Taxonomy Level	Cos	Marks
Q.01	a	Define computer graphics. Illustrate the applications of computer graphics.	L3	CO1	5M
Q.01	b	Illustrate Display Window management system using GLUT.	L3	CO1	5M
Q.01	c	Apply Bresenham's line drawing algorithm to digitize the line with end points (20,10) to (30,18).	L3	CO1	10M
OR					
Q.02	a	Demonstrate the different OpenGL Functions, With a simple Open GL program.	L2	CO1	8M
	b	Illustrate the need of homogenous coordinate system and demonstrate translation, rotation, scaling in 2D homogeneous coordinate system with matrix representation.	L3	CO1	8M
	c	Difference between Raster Scan and Random Scan display.	L2	CO1	4M
Module-2					
Q. 03	a	Summarize 2-D transformations with suitable example.	L2	CO2	6M
	b	Construct a matrix representation for rotation of a object about a specified pivot point in 2-D	L3	CO2	8M
	c	Given a triangle with points A (1, 1) , B (0, 0) and C (1, 0) . You need to apply shear parameter 2 on the X-axis and 2 on Y-axis and find out the new coordinates of the object.	L3	CO2	6M
OR					
Q.04	a	Illustrate Raster Methods for 2D Geometric Transformations.	L3	CO2	10M
	b	Summarize other 3-D transformations with suitable example.	L2	CO2	10M
Module-3					
Q. 05	a	Elaborate the following OpenGL functions by using suitable code snippet. 1) GLUT Mouse Functions 2) GLUT Keyboard Functions 3) OpenGL Menu Functions	L3	CO3	12M
	b	List and explain the characteristics of good interactive program.	L2	CO3	8M
OR					
Q. 06	a	Illustrate the use of Morphing with edge equalization and vertex equalization.	L3	CO3	12M
	b	Explain the steps involved in Design of Animation.	L2	CO3	8M
Module-4					
Q. 07	a	Define image processing, Explain the types of imaging.	L2	CO4	10M
	b	With a neat diagram demonstrate the fundamental steps in Digital Image Processing.	L2	CO4	10M

OR						
Q. 08	a	Discuss the types of connectivity in image processing.	L2	CO4	8M	
	b.	List and explain the types of 1)Arithmetic operation 2)Geometric operation in images	L2	CO4	12M	
Module-5						
Q. 09	a	Illustrate the concept of image interpolation technique.	L3	CO5	10M	
	b	Consider the image segment and compute the length of the shortest 4- , 8- and m-path between p and q by considering two set of values for V: (i) V= {0,1,2} (ii)V= {1,2}. If a particular path does not exist, explain the reason for the above two cases of V. <pre> 3 4 1 2 0 0 1 0 4 2(q) 2 2 3 1 4 (q)3 0 4 2 1 1 2 0 3 4 </pre>	L3	CO5	10M	
OR						
Q. 10	a	Define image segmentation, Elaborate the types of segmentation algorithm.	L3	CO5	10M	
	b	Explain the following with respect to Edge detection algorithm. 1)Roberts Operator 2)Prewitt Operator	L2	CO5	10M	

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Sixth Semester B.E. Degree Examination
Subject Title : Computer Graphics and Fundamentals of Image Processing

Time : 03 Hours

Max. Marks : 100

Note:

Answer any Five Full questions, choosing at least one question from each module

Q. No	Module 1	Marks	CO	RBT Cognitive Level
1	a) Distinguish between raster scan display and random scan display.	[10 Marks]	1	1,2
	b) With a neat diagram describe the working of a cathode ray display device.	10 Marks]	1	1,2
OR				
2	a) Using both DDA and Bresenham's line drawing algorithm, plot the line with endpoints (20,15) and (34,20).	[10 Marks]	2	1
	b) Describe the DDA line drawing algorithm. Use the algorithm to find the coordinate along the line joining the pixel positions (5,12) and (15,20).	[10 Marks]	1	1
Module 2				
3	a) What is meant by homogeneous coordinate system. Explain in detail	[10 Marks]	1	2
	b) Prove that two successive translations and rotations are additive.	[10 Marks]	2	2
OR				
4	a) Prove that the multiplication of 3D transformations matrices for each of the following sequences of operations is commutative. <ul style="list-style-type: none"> ● Any two successive translations. ● Any two successive scaling operations. 	[10 Marks]	2	2

		<ul style="list-style-type: none"> Any two successive rotations about any one of the coordinate axes. 																																		
	b)	Write a note on <ol style="list-style-type: none"> 3D Transformations OpenGL 2D functions 	[10 Marks]	3	2																															
Module 3																																				
5	a)	Describe the following terms <ul style="list-style-type: none"> Window Viewport World coordinate Device coordinate 	[10 Marks]	3	2																															
	b)	Explain three dimensional translation, rotation and scaling with matrix representation	[10 Marks]	1	2																															
OR																																				
6	a)	Explain design of animation sequences, traditional animation techniques	[10 Marks]	3	2																															
	b)	Explain character animation and openGL animation procedures	[10 Marks]	3	2																															
Module 4																																				
7	a)	Explain the nature of Image Processing	[10 Marks]	4	2																															
	b)	For the given Image, Find the following, given $V = [2,3]$ <ol style="list-style-type: none"> 4 – adjacency 8 – adjacency m – adjacency <table border="1" style="margin-left: 40px;"> <tr><td>3</td><td>8</td><td>5</td><td>1</td></tr> <tr><td>1</td><td>2 (p)</td><td>3</td><td>4</td></tr> <tr><td>4</td><td>1(q)</td><td>6</td><td>3</td></tr> <tr><td>1</td><td>1</td><td>3</td><td>2</td></tr> </table> <table border="1" style="margin-left: 40px;"> <tr><td>3</td><td>8</td><td>5(q)</td><td>1</td></tr> <tr><td>1</td><td>2 (p)</td><td>3</td><td>4</td></tr> <tr><td>4</td><td>1</td><td>6</td><td>3</td></tr> <tr><td>1</td><td>1</td><td>3</td><td>2</td></tr> </table>	3	8	5	1	1	2 (p)	3	4	4	1(q)	6	3	1	1	3	2	3	8	5(q)	1	1	2 (p)	3	4	4	1	6	3	1	1	3	2	[10 Marks]	4
3	8	5	1																																	
1	2 (p)	3	4																																	
4	1(q)	6	3																																	
1	1	3	2																																	
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1	2 (p)	3	4																																	
4	1	6	3																																	
1	1	3	2																																	

OR																					
8	a)	For the given Image, Find the following give $V=[2,3]$ <ol style="list-style-type: none"> City block distance (p,q) Chess board distance (p,q) Euclidean distance (p,q) M – distance (p,q) <table border="1" style="margin-left: 40px;"> <tr> <td>3</td> <td>2</td> <td>2 (p)</td> <td>4</td> </tr> <tr> <td>5</td> <td>3</td> <td>4</td> <td>2</td> </tr> <tr> <td>1</td> <td>4</td> <td>5</td> <td>2</td> </tr> <tr> <td>3</td> <td>4 (q)</td> <td>2</td> <td>3</td> </tr> </table>	3	2	2 (p)	4	5	3	4	2	1	4	5	2	3	4 (q)	2	3	[10 Marks]	3	2
	3	2	2 (p)	4																	
5	3	4	2																		
1	4	5	2																		
3	4 (q)	2	3																		
	b)	Explain the arithmetic and logical operations on images	[10 Marks]	4	2																
Module 5																					
9	a)	Explain the classification of segmentation algorithms	[10 Marks]	4	2																
	b)	1. Explain the following <ol style="list-style-type: none"> Point Detection Line Detection Edge detection 	[10 Marks]	4	2																
OR																					
10	a)	Explain the First – order edge detection operators	[10 Marks]	4	2																
	b)	Explain the following <ol style="list-style-type: none"> Sobel Operator Roberts Operator Prewitt Operator Canny edge detector 	[10 Marks]	4	2																



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Sixth Semester B.E. Degree Examination

COMPUTER GRAPHICS AND FUNDAMENTALS OF IMAGE PROCESSING

TIME: 03 Hours

Max. Marks: 100

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	How are images rendered on a monitor using raster-scan technology	L1	CO1	5M
	b	Develop an OpenGL program that draws a simple red line.	L3	CO1	8M
	c	Explain the significance of point attributes, line attributes, and curve attributes in OpenGL.	L2	CO1	7M
OR					
Q.02	a	With a neat diagram, explain the architecture of a raster display system with integrated display processor.	L2	CO1	7M
	b	Explain in brief i. Applications of Computer Graphics ii. Coordinate Reference Frames	L2	CO1	7M
	c	What is DDA line drawing algorithm and illustrate with an example.	L1	CO1	6M
Module-2					
Q. 03	a	Define the two dimensional translation, rotation and scaling matrix operations.	L1	CO2	5M
	b	Discuss the differences between Raster Scan Systems and Random Scan Systems.	L3	CO2	8M
	c	Write a note on OpenGL geometric transformations functions.	L2	CO2	7M
OR					
Q.04	a	Define the Matrix Representation. Give examples.	L1	CO2	5M
	b	Discuss raster methods for geometric transformations	L3	CO2	8M
	c	Summarize Error Handling in OpenGL.	L2	CO2	7M
Module-3					
Q. 05	a	Explain the general computer-animation functions and their applications.	L2	CO3	7M
	b	Discuss the logical classification of input devices.	L3	CO3	8M
	c	What are periodic motions in computer animation? Underline the principles involved.	L1	CO3	5M
OR					
Q. 06	a	Explain the OpenGL Interactive input device functions in detail.	L2	CO3	7M
	b	Define traditional animation techniques and list some examples.	L1	CO3	5M
	c	Discuss the steps and considerations in designing of a Graphical User Interface GUI	L3	CO3	8M
Module-4					
Q. 07	a	Given a gray scale image of size 5inches by 6inches scanned at the rate of 300 dpi. Solve the following:	L3	CO4	8M

		<ul style="list-style-type: none"> i. How many bits are required to represent the image? ii. How much time is required to transmit the image if the modem is 28kbps iii. Repeat the before mentioned if it were a binary image. 			
	b	Explain the Logical operations of images give the truth table for all.	L2	CO4	6M
	c	Outline the Interpolation techniques and set operations on images	L2	CO4	6M
OR					
Q. 08	a	Define the following in brief: <ul style="list-style-type: none"> i) Grey scale Images ii) Binary Images iii) True colour Images iv) Psuedo colour Images v) Image Connectivity vi) Distance Measures 	L1	CO4	6M
	b	Explain the Arithmetic operations of images with relevant equations.	L2	CO4	7M
	c	Explain the Convolution and Correlation operations on images and their significance.	L2	CO4	7M
Module-5					
Q. 09	a	Explain the Laplacian of Gaussian operator with relevant equations.	L2	CO5	6M
	b	Discuss the following with relevant equations: <ul style="list-style-type: none"> i) Roberts operator ii) Prewitt operator iii) Sobel operator 	L3	CO5	8M
	c	Explain Canny edge detection in detail	L2	CO5	6M
OR					
Q. 10	a	Outline the importance of image segmentation and illustrate the classification of image segmentation algorithms.	L2	CO5	6M
	b	Discuss the following in brief: <ul style="list-style-type: none"> i) Point Detection ii) Line Detection iii) Edge detection 	L3	CO5	8M
	c	Illustrate with a flow chart the Edge Detection process.	L2	CO5	6M

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.