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

USN | | | | | | | | | | |

7th Semester B.E. Degree Examination

Digital 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	BTL	COs	Marks
Q.01	a	What is digital image processing? Explain the applications of image processing.	L2	CO1	10
	b	With a black diagram explain the fundamental steps involved in digital image processing.	L2	CO1	10
		OR			
Q.02	a	With the help of a neat diagram, explain the components of a general purpose image processing system.	L2	CO1	10
	b	Explain the image acquisition using sensor strips and sensor arrays	L2	CO1	10
		Module-2			
Q. 03	a	Explain DCT with equation and hence obtain 2X2 DCT matrix	L2	CO2	10
	b	Explain the Two-Dimensional Orthogonal and Unitary Transforms	L2	CO2	10
		OR			
Q.04	a	Explain Haar Transforms with equation and hence obtain 2X2 Haar Transform matrix	L2	CO2	10
	b	State the following properties of 2D DFD i) Translation ii) Periodicity iii) Rotation iv) Convolution theorem.	L2	CO2	10
		Module-3			
Q. 05	a	With necessary graphs explain the log and power law transformation used for spatial image enhancement	L2	CO3	10
	b	Discuss local histogram processing	L2	CO3	10
		OR			
Q. 06	a	Explain image sharpening in spatial domain using second order derivative filters	L2	CO3	10
	b	Elaborate order-statistics filters	L2	CO3	10
		Module-4			
Q. 07	a	Explain smoothing of images in frequency domain using Ideal, Butterworth and Gaussian low pass filter.	L2	CO4	10
	b	Describe the process of RGB to HSI conversions with mathematical equations	L2	CO4	10
		OR			
Q. 08	a	Discuss the homomorphic filtering approach for image enhancement.	L2	CO4	10
	b	With a neat sketch, explain color chromaticity diagram.	L2	CO4	10
		Module-5			
Q. 09	a	Explain the model of the image degradation/restoration process.	L2	CO5	10
	b	Explain Noise models along with Equations	L2	CO5	10
		OR			
Q. 10	a	what are adaptive filters? Explain adaptive local noise reduction and adaptive median filter with the algorithms.	L2	CO5	10
	b	Assuming only the presence of noise in an image, explain the following mean filters. i) automatic mean filter ii) geometric mean filter	L2	CO5	10

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DIGITAL IMAGE PROCESSING

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Note: 01. 02. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.
03.
04.

		Module -1	*Bloom's Taxonomy Level	COs	Marks
Q.01	a	What is Digital Image Processing? Explain the origin of Digital Image Processing.	L1	CO1	10
	b	Explain the Fundamental steps in Image Processing with block diagram	L1	CO1	10
		OR			
Q.02	a	With neat block diagram, explain the components of an Image Processing System.	L1	CO1	10
	b	Briefly Explain the Elements of Visual Perception	L1	CO1	10
		Module-2			
Q. 03	a	What is the need for an image transform? State 2D orthogonal unitary transform with its properties.	L2	CO2	10
	b	State and prove the properties of DFT.	L2	CO2	10
		OR			
Q.04	a	Compute Discrete Cosine transform for N=4.	L3	CO2	10
	b	Explain the algorithmic steps in Haar Transform.	L2	CO2	10
		Module-3			
Q. 05	a	Define histogram. Explain the concept of histogram processing.	L2	CO3	10
	b	Explain the sharpening filters in spatial domain for image enhancement.	L3	CO3	10
		OR			
Q. 06	a	Define histogram equalization. How image is enhanced using this method.	L2	CO3	10
	b	Illustrate Homomorphic filtering in image enhancement	L2	CO3	10

		Module-4			
Q. 07	a	Explain the smoothing filters in frequency domain for image enhancement	L2	CO4	10
	b	Explain RGB and HIS color models.	L2	CO4	10
		OR			
Q. 08	a	Explain the sharpening filters in frequency domain for image enhancement.	L2	CO4	10
	b	Explain the concept of pseudocolor image processing.	L2	CO4	10
		Module-5			
Q. 09	a	With the help of block diagram,explain the Image Degradation/Restoration process.	L2	CO5	10
	b	Expalin how filtering is done in Inverse filter	L2	CO5	10
		OR			
Q. 10	a	Explain the following a) periodic noise b) Estimation of noise parameters.	L2	CO5	10
	b	Explain the filters used for image restoration in the frequency domain.	L2	CO5	10

*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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7th Semester B.E. Degree Examination

DIGITAL IMAGE PROCESSING

TIME: 03 Hours **Max. Marks: 100**

Note: 01. 02. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.
03.
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		Module -1	*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Explain the structure of eye with neat sketch.	L1	CO1	10
	b	. Briefly explain the following a.Neighbors of a pixel b. path and connectivity c.Distance function d.Euclidean distance e.City block and checker board distance	L1	CO1	10
		OR			
Q.02	a	Illustrate Image Sampling and Quantization with an example.	L1	CO1	10
	b	Explain 4,8 and m adjacency with example.	L1	CO1	10
		Module-2			
Q. 03	a	Define Discrete Cosine transform and state its properties.	L2	CO2	10
	b	Perform Haar Transform for N=2 .	L2	CO2	10
		OR			
Q.04	a	Compute Discrete Cosine transform for N=4.	L3	CO2	10
	b	Discuss the steps in Hadamard transform and compute for N=4.	L2	CO2	10
		Module-3			
Q. 05	a	Perform Histogram equalization of the image 4 4 4 4 4 3 4 5 4 3 3 5 5 5 3 3 4 5 4 3 4 4 4 4 4	L2	CO3	10
	b	Briefly explain contrast stretching and bitplane slicing.	L2	CO3	10
		OR			
Q. 06	a	Explain the basic intensity transformations.	L2	CO3	10
	b	Explain the smoothing filters in spatial domain for image enhancement.	L2	CO3	10

Module-4					
Q. 07	a	Explain with block diagram the basic steps for image filtering in frequency domain.	L2	CO4	10
	b	Explain the conversion steps of RGB color model to HIS color model.	L2	CO4	10
OR					
Q. 08	a	Explain the smoothing filters in frequency domain for image enhancement.	L2	CO4	10
	b	What is the necessity of color model. Convert HIS color model to RGB color model.	L2	CO4	10
Module-5					
Q. 09	a	Explain Alpha-trimmed mean filter and Adaptive median filter.	L2	CO5	10
	b	Derive the expression for MSE and SNR in Wiener filter or Minimum mean square Error filter.	L2	CO5	10
OR					
Q. 10	a	Discuss the different noise models with their probability Density Functions(PDF).	L2	CO5	10
	b	Explain the filters used for image restoration in the presence of noise or spatial filtering.	L2	CO5	10

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Digital Image Processing

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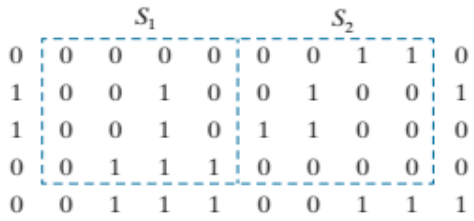
Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module -1	*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Explain the Fundamental Steps in Digital Image Processing	L2	CO1	**8 M**
	b	Elements of Visual Perception with human eye diagram	L2	CO1	**8 M**
	c	Consider the two image subsets, S_1 and S_2 in the following figure. and assuming that V = {1}, determine whether these two subsets are 4, 8 and m- adjacent 	L3	CO1	**4 M**
		OR			
Q.02	a	Explain the origin and the fields that use Digital Image Processing	L2	CO1	**8 M**
	b	Explain Image Sensing and Acquisition using single sensor and line sensor	L2	CO1	**8 M**
	c	Consider the image segment shown in the figure. Let $V = \{0, 1\}$ be the set of intensity values used to define adjacency. Compute the lengths of the shortest 4-, 8-, and m-path between p and q in the following image. If a particular path does not exist between these two points, explain why. 	L3	CO1	**4 M**
		Module-2			
Q. 03	a	Explain the two-Dimensional Orthogonal transform along with its properties	L2	CO2	**10 M**
	b	Derive a 4 X 4 cosine Transform matrix and hence mention properties of DCT	L2	CO2	**10 M**
		OR			
Q.04	a	Explain the properties of Two-Dimensional DFT	L2	CO2	**10 M**
	b	Derive a 4 X 4 Haar Transform matrix and hence mention properties of Haar transforms	L2	CO2	**10 M**

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Module-3					
Q. 05	a	Explain piecewise linear transformation functions	L2	CO3	**8 M**
	b	Explain the concepts of Bit plane slicing and intensity slicing	L2	CO3	**8 M**
	c	Propose a method for extracting the bit planes of an image based on converting the value of its pixels to binary. Find all the bit planes of the following 4-bit image: 0 1 8 6 2 2 1 1 1 15 14 12 3 6 9 10	L3	CO3	**4 M**
OR					
Q. 06	a	Explain the Fundamentals of Spatial Filtering	L2	CO3	**8 M**
	b	Explain the working of Sharpening Spatial Filters and hence obtain Laplacian filter coefficients	L2	CO3	**8 M**
	c	Perform Histogram Equalization for the following 2 bit image 0 0 1 2 2 3 3 1 1 2 1 3 2 3 2 3	L3	CO3	**4 M**
Module-4					
Q. 07	a	Explain the basics of Filtering in the Frequency Domain	L2	CO4	**10 M**
	b	Explain Image Sharpening Using Frequency Domain Filters.	L2	CO4	**10 M**
OR					
Q. 08	a	Explain RGB and HSI Color Models	L2	CO4	**10 M**
	b	Explain Pseudo-color Image Processing.	L2	CO4	**10 M**
Module-5					
Q. 09	a	Explain model of the Image Degradation/Restoration Process,	L2	CO5	**10 M**
	b	Explain Noise models	L2	CO5	**10 M**
OR					
Q. 10	a	Explain the working of Adaptive median and adaptive local noise reduction filters	L2	CO5	**10 M**
	b	Explain the working of Minimum Mean Square Error (Wiener) Filtering.	L2	CO5	**10 M**

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