## 2024

# **Digital Image Processing**

Full Marks : 100

# Time : Three hours

#### The figures in the margin indicate full marks for the questions.

## Answer any five questions.

1.	a)	Describe the different processing level in digital image processing.	3
	b)	What are the key stages in digital image processing? Mention each stage with diagram	5
		and example.	5
	c)	Define image sampling and quantization with the diagram.	6
	d)	What are the basic relationships among the pixels?	6
		Kokrajhar :: Bodoland	
2.	a)	Calculate the chess board and city block distance for the pixels a and b with coordinates	
		(6, 9), (18, 24) and shown in the matrix form.	4
	b)	What are the different types of noises?	4
	<b>c</b> )	What is the difference between image enhancement and image restoration?	4
	d)	What is the purpose of contrast stretching, and how is it applied in image enhancement?	4
		Explain the role of filtering in image enhancement. What is the difference between low-	4
	e)	pass and high-pass filters?	-
3.	a)	Describe the thick edge and also the impact of Gaussian noise.	5
	b)	What do you mean by image gradient?	5
	<b>c</b> )	Mention the masks used for point and line detection.	5
	<b>d</b> )	Write down all the steps of canny edge detector.	5
4.	a)	What is the HSI color model, and how does it differ from the RGB model?	4
	b)	How is histogram equalization applied to color images, and what challenges arise	6
		compared to grayscale image histogram equalization?	
	c)	The Given two mean vectors are $m_A = (3.4, 1.4)$ and $m_B = (4.0, 2.0)$ of two classes A and D respectively. What is the desiries how down?	4
		B respectively. what is the decision boundary?	
	d)	binterentiate between tossiess and tossy predictive county in the image compression	6
		icenniques.	
5	Write short notes on the following (any four):		4x5=20
5.	a)	Entrony	<b>HAJ-20</b>
	a) h)	Histogram equalization	
	c)	Coding redundancy in digital images	
	d)	Minimum distance Classifier	
	e)	Boundary extraction in Morphological algorithms	
6.	Differentiate between the following ( <i>any four</i> ):		4x5=20
	a)	Perceptron and multilayer feed forward neural network model	
	b)	Mean filters and order-statistics filter	
	c)	Dilation and Erosion (Morphological operators)	
	d)	Shape-matching and Sting-matching algorithms in structural methods	
	<b>e</b> )	Metric and Topological properties	