

USN _____

MCA Library

Sixth Sem

Date _____

Time: 3 hrs.

BANGALORE

Note: 1. A

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025

Time: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2.. *M* : Marks , *L*: Bloom's level , *C*: Course outcomes.

Module – 1			M	L	C
Q.1	a.	Explain the fundamental steps in Digital Image Processing.	10	L2	CO1
	b.	Consider the 2 image subsets, S_1 and S_2 shown below. For $V = \{1\}$, determine whether these subsets are 4 – adjacent, 8 – adjacent and m-adjacent.	10	L3	CO1
OR					
Q.2	a.	Explain the components of a general purpose image processing system.	10	L2	CO1
	b.	Consider the image segment shown below. Let $V = \{2, 3, 4\}$. Find the lengths of the shortest 4-, 8-, and m – paths between p and q.	10	L3	CO1
Module – 2					
Q.3	a.	Justify that DCT is a fast transform.	10	L3	CO1
	b.	Find the 2D – DFT of the following image.	10	L3	CO2
OR					
Q.4	a.	Justify that Haar Transform can be implemented in $O(N)$ operations.	10	L3	CO2
	b.	Find the - DCT of $x(n) = \{1, 2, 1, 4\}$	10	L3	CO2
Module – 3					
Q.5	a.	Describe image negative and logarithmic transformations.	10	L1	CO3

1 of 2

	b.	Assuming continuous intensity values, an image has the intensity pdf, $P_r(r) = \begin{cases} \frac{2r}{(L-1)^2}, & 0 \leq r \leq L-1 \\ 0 & \text{else where} \end{cases}$ Find the transformation function that would produce an image whose intensity pdf is, $P_z(z) = \begin{cases} \frac{3z^2}{(L-1)^3}, & 0 \leq z \leq L-1 \\ 0 & \text{else where} \end{cases}$	10	L3	CO3
OR					
Q.6	a.	Explain piecewise – linear transformation functions used in image enhancement.	10	L2	CO3
	b.	Find histogram linearization of the following image segment. $\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$	10	L3	CO3
Module – 4					
Q.7	a.	Describe image smoothing filters in frequency – domain.	10	L1	CO4
	b.	Explain pseudo colour Image Processing.	10	L2	CO4
OR					
Q.8	a.	Explain Image sharpening filters in frequency – domain.	10	L2	CO4
	b.	Describe homomorphic filtering in detail.	10	L1	CO4
Module – 5					
Q.9	a.	Describe a model for image degradation /restoration process.	10	L1	CO5
	b.	Explain some important noise pdfs.	10	L2	CO5
OR					
Q.10	a.	Explain 4 order – statistics filters used in image restoration.	10	L2	CO5
	b.	Describe 4 mean filters used in image restoration.	10	L1	CO5
