Total number of printed pages: **01** **UG/ 8th Sem/UIE819**

2025

DIGITAL IMAGE PROCESSING

Full Marks: 100: Time: Three hours

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

Answer ***any___05___*** *questions out of 07.*

1	a	Find the number of bits required to store a 256 X 256 image with 32 gray levels	10
	b	Define the term "Histogram" and explain its importance.	05
	c	State the Nyquist Sampling Theorem in image processing.	05
2	a	Compute median of following image using 3x3 mask. $\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & 128 & 24 & 172 & 26 & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$	10
	b	What is Gray binary code?	05
	c	Block diagram of converting an analog image to a digital image.	05
3	a	Describe the basic relationship between the pixels • Neighbours of a pixel • Adjacency, Connectivity, Regions and Boundaries • Distance measures	10
	b	Describe the HSI colour image model	05
	c	Define m- connectivity.	05
4	a	Explain with examples on Opening morphological operation.	10
	b	Explain Median and mean filtering?	05
	c	What is the difference between grayscale and color images?	05
5	a	What is the role of sampling and quantization process in image digitization?	10
	b	What is a pixel? How to define FHD and 4K resolution?	05
	c	Explain under-sampling and its effect on image.	05
6	a	Explain image compression and its types	10
	b	What is Wavelet decomposition?	05
	c	State the mathematical expressions for types of affine transformation.	05
7	a	Explain with the help of block diagram-(i) Homomorphic filtering (ii) JPEG Compression	10
	b	Translate an image by 50 pixels in x-direction and 30 pixels in y-direction.	05
	c	What do you mean by convolution? Explain all the properties of convolution.	05