

Roll No.

Total Pages : 3

015702

December 2023

B.Tech. (ENC) VIIIth SEMESTER

Digital Image Processing and Analysis (ECPEL-707)

Time : 3 Hours]

[Max Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Find the number of bits required to store a 256×256 image with 32 gray levels? (1.5)
(b) Write down $N_4(p)$, $N_D(p)$, and $N_8(p)$ for a pixel at (x, y) . (1.5)
(c) Draw the block diagram of image degradation (restoration) model and explain in brief. (1.5)
(d) Define median and mid-point filter. (1.5)
(e) Why we use segmentation? (1.5)
(f) What do you understand by histogram equalization? (1.5)

015702/100/111/263

[P.T.O.]

- (g) Define compression in digital image processing. (1.5)
- (h) What is Hue and Saturation? (1.5)
- (i) What do you mean by Colour model? (1.5)
- (j) Define sampling and quantization in digital image processing. (1.5)

PART-B

2. (a) Let V be the set of intensity values. For $V = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, find out 4 - adjacency, and 8 - adjacency. (10)

$$\begin{bmatrix} 54 & 10 & 100 & 8 \\ 81 & 150 & 2 & 34 \\ 201 & 200 & 3 & 45 \\ 7 & 70 & 147 & 56 \end{bmatrix}$$

- (b) Describe the elements of a digital image processing system. (5)
3. (a) Explain Hadamard transform in detail. (5)
- (b) Apply histogram equalization (Automatic) on 64×64 , 8 level gray image. The gray level distribution is given as : (10)

rk	0	1	2	3	4	5	6	7
nk	790	1023	850	656	329	245	122	81

Draw the Equalized Histogram.

4. Explain Otsu and adaptive algorithm of thresholding in detail. (15)

- 5. (a) Describe edge detection, line detection and point detection. (5)
 - (b) Define frequency domain low pass and high pass filter. (10)
6. (a) Define Lossless and lossy compression techniques. Explain LZW compression technique in detail. (10)
- (b) Compare RGB and HSI colour image models. (5)
7. What are the different colour models used in image processing? Explain in detail. Give the conversion formula between RGB to HSI model. (15)