University of Engineering & Management, Kolkata
2nd Term Examination, November, 2023
Programme Name: B.Tech in CSE / CSE (AIML)
Semester: 5th
Course Name: Professional Elective - I : Image Processing
Course Code: PECCSE501A

Full Marks: 30 | Date: 7th November, 2023 | Time: 3.30 pm – 4.30 pm

Part - A
Attempt 5 questions
Each question carries 2 Marks (2 X 5)

1.A. Distinguish between smoothing and sharpening filters.

Or

1.B. Describe Histogram.

2.A. Define image sensing sensors and give short note.

Or

2.B. List down the basic components of image processing system.

3.A. Illustrate Ideal Low-Pass Filter.

Or

3.B. Illustrate Ideal High-Pass Filter.

4.A. Compare adjacency and connectivity.

Or

4.B. Compare Brightness and Contrast.

5.A. Explain Gaussian High-Pass filter with proper example.

Or

5.B. Explain Gaussian Low-Pass filter with proper example.

Part - B
Attempt 2 questions
Each question carries 5 Marks (5 X 2)

6.A. Complete the implementation of Huffman encoding on an image of size 10×10 (5 bit) for the following symbols.
a1=12 , a2=33 , a3=15, a4=9, a5=12, a6=19

Or

6.B. Complete the implementation of Run Length Encoding on the following image.

0	0	0	0	0	0	0	1
1	1	1	1	1	1	1	1
1	0	0	0	0	0	1	1
1	1	1	1	1	1	1	1
1	1	0	0	0	0	0	0
0	0	0	0	0	1	1	1
1	1	1	1	0	0	0	0
0	0	1	1	1	1	1	1

7.A. Complete the implementation of Sobel edge detection technique on the following image using wrap around concept.

174	195	45
94	120	151
172	223	71

Or

7.B. Complete the implementation of Prewitt filtering on the following image using wrap around concept.

47	123	12
89	53	62
108	151	213

Part - C

Attempt 1 question

Each question carries 10 Marks (10 X 1)

8.A. Evaluate the performance of Arithmetic Mean and Geometric Mean by measuring the PSNR values for the following image. Have an addition of 5 with all intensity values of the image and get the noisy image also wrap around it. Apply both the filters on wrap around Noisy image.

124	251	65	148
210	59	35	78
49	65	71	217
42	43	45	75

Or

8.B. Evaluate the performance of Harmonic Mean and Median by measuring the PSNR values for the following image. Have an addition of 12 with all intensity values of the image and get the noisy image also wrap around it. Apply both the filters on wrap around Noisy image.

24	51	165	48
176	59	135	178
49	165	171	21
142	143	245	175