POKHARA UNIVERSITY

Level: Bachelor Semester:Fall Year : 2020
Programme:BE Full Marks: 100
Course: Image Processing and Pattern Recognition Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is a digital image? Explain spatial resolution and intensity level resolution with examples. 7
   b) State different types of Gray Level Transformations. Explain any three of them in brief. 8

2. a) Given below are gray level frequencies of a 3 bit image. Equalize the histogram over the range. 7

Gray Level (I)	0	1	2	3	4	5	6	7
Frequency n(I)	32	160	128	512	192	256	704	64

   b) Perform Haar transform and its Inverse for 4x4 image given below. 8

1	2	5	0
7	2	5	6
4	5	3	3
7	6	1	2

3. a) What are the steps involved in frequency domain filtering? Explain the essential properties of 2-D Discrete Fourier Transform? 7
   b) Compare image enhancement and image restoration. Explain different noise models in an image with their probability density functions. 8

4. a) Construct Huffman coding for each gray level and find compression ratio and coding efficiency: 8

Gray level(r)	0	1	2	3	4	5	6	7
Frequency N_r	500	200	250	100	250	500	150	50

   b) Differentiate between lossless and Lossy Compressions. 7

5. a) Find Dilation and Erosion for the following image A and structuring element B. 7

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

A

1
1
1

B

   b) Explain basic global thresholding and region splitting in image segmentation with example. 8

6. a) Describe Edge Detection method for Image Segmentation 7
   b) Define Chain codes. Explain 4 and 8-connectivity segments to explain chain codes with suitable examples. 8

7. Write short notes on: **(Any two)** 2×5
   a) Neural Network in Image Processing
   b) Pattern recognition in Image
   c) Spatial low pass filter.