POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2018
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 the fundamental steps in Digital Image Processing. 7
   b) Compute the histogram equalization from the given data. 8

r_k	0	1	2	3	4	5	6	7
n_k	5320	1000	500	525	1236	956	128	856

2. a) What is zooming? Illustrate with an example the concept of zooming by interpolation and replication. 7
   b) What are the basic steps for filtering an image in frequency domain? Elaborate with examples. 8
3. a) Calculate Haar transform T from given image matrix F. 7

   F=

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

   b) Explain the noise degradation and restoration model with necessary diagram in detail. 8
4. a) Define Redundancy. Suppose a source generates the symbols s1, s2, s3, s4, s5 randomly with probability p1=0.4, p2=0.2, p3=0.2, p4=0.1 and p5=0.1 respectively. Generate the code-word for each symbol using Huffman coding and also calculate entropy and efficiency. 8
   b) Explain Lossy Predictive Coding along with required equations and suitable block diagram. 7
5. a) Compare and explain the process of Dilation and Erosion in image processing with necessary equations and suitable figures. 8

   b) Explain image segmentation by Threshold method. 7
6. a) Explain the region growing technique for image segmentation. What are the problems associated with it? 8
   b) What is neural network? Explain how it can be used for pattern recognition. 7
7. Write short notes on: (**Any two**) 2×5
   a) Pattern recognition system
   b) Shape number
   c) Decision Theoretic Method