POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2017
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 digital image? How is it represented? Explain briefly about the elements used in image processing? 8
   b) What do you mean by distance measures in image processing system? Explain with types. 7
2. a) Define Point Operation. Explain the technique used by Bit plane intensity level slicing for the purpose of image enhancement. 8
   b) What is histogram? What is the importance of histogram modeling in image processing? Given the following gray level of an image. Compute the gray levels after histogram equalization. 7

Grey Level	0	1	2	3	4	5	6	7
Frequency	790	1024	850	65	329	245	122	81

3. a) Differentiate between Spatial domain enhancement and Frequency domain enhancement. Mention the properties of Fourier transform 7 8
   b) Explain different technique used to sharpen an image. Explain Hadamard Transform.
4. a) Compare different types of Noise in terms of Spatial and frequency Properties. Suggest Corresponding filtering techniques for each type of Noise. 8
   b) Explain the basic concept of differential predictive coding in terms of lossless coding with suitable figure. 7
5. a) Define Dilation, Erosion, Opening and Closing. Choose different objects and structuring elements to show the result of these operations. 8
   b) What is region based segmentation? Explain the types of region segmentation. 7

6. a) Explain edge detection techniques with its assumption. Explain Hough transform for detecting lines with suitable figures. 8
   b) What is pattern recognition? How does pattern/image is recognized by a computer? 7
7. Write short notes on: (**Any two**) 2×5
   a) Hopfield Network
   b) Run Length Coding
   c) Shape number and chain codes