POKHARA UNIVERSITY

Level: Bachelor Semester: Spring 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) Define Digital Image Processing. Also discuss the various fundamental steps in DIP with block diagram. 8

   b) Discuss the importance of histogram modelling. Explain the algorithm for histogram equalization. 7

2. a) Explain the term intensity level slicing and bit plane slicing. Explain adaptive median filter with suitable algorithm for its implementation. 7

   b) Write expression for forward and inverse Discrete Fourier Transform (DFT) for 2D signal. What are the properties of DFT.? 8

3. a) Define Hadamard Transform and derive the 8x8 transform matrix for Hadamard Transform. 8

   b) Explain about the noise restoration model. How the periodic noise occurring in an image can be removed? 7

4. a) Define Redundancy. What are image compression techniques? Source generate the symbol 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 codeword for each symbol using Huffman coding. 8

   b) Discuss the importance of image compression. Explain lossless Predictive coding with block diagram 7

5. a) With necessary figures, explain the opening and closing. 8

   b) How can you detect edges with gradient filters? Give different first order derivative based (gradient) filters. 7

6. a) What do you understand by image segmentation? How discontinuity based segmentation approach is performed in image? Explain. 8

   b) What is pattern and pattern classes? How is an object recognized by minimum distance classifier? 7

7. Write short notes on: **(Any two)** 2×5

   a) Pattern Recognition

   b) Fourier Descriptor

   c) Bayesian Classifier