Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

SEVENTH SEMESTER B.TECH (INSTRUMENTATION & CONTROL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: IMAGE PROCESSING [ICE 449]

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:

❖ Answer **ANY FIVE FULL** questions.
❖ Missing data may be suitably assumed.

1A.	What are the components of digital image processing system?	4
1B.	Explain any four basic relationships between two pixel.	4
1C.	Define following terms: 1. Image negative 2 Gamma transformation	2
2A.	Explain different sensor arrangements used for image acquisition:	3
2B.	Draw the structure of image formation model. Explain the importance of brightness adaptation in image processing.	4
2C.	What are Spatial and Gray Level Resolutions? Give an example for each.	3
3A.	Explain two dimensional Fourier transform (2D DFT) with its any two properties.	4
3B.	What is histogram matching? Compute the histogram equalization for the following probabilities having eight gray levels. B = {0.19, 0.25, 0.21, 0.16, 0.08, 0.06, 0.03, 0.02}.	4
3C.	Define contrast stretching with an example.	2
4A.	What is image sharpening spatial filter? Explain different types with example.	4
4B.	What are order statistics filters? Explain median filter with an example.	3
4C.	Give the model of image restoration when an additive noise term is operated on the input image in spatial domain.	3
5A.	Compare subjective and objective fidelity criteria with suitable example.	3
5B.	Explain the active processing stages of Lossless predictive encoding.	3
5C.	What are lossless compression techniques? Compute the Huffman coding for the following probability distribution. A = {0.4, 0.3, 0.1, 0.1, 0.06, 0.04}	4
6A.	Discuss the active feature processing stages of an object detection system.	3
6B.	Design a multi-dimensional data processing pipeline for an object recognition system in frequency domain.	3
6C.	Write a short note on the following with its probability density function: 1. Gaussian Noise 2. Rayleigh Noise	4