Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institution of Manipal University

SEVENTH SEMESTER B.TECH (INSTRUMENTATION & CONTROL ENGG.)

END SEMESTER EXAMINATIONS, NOV - 2017

SUBJECT: DIGITAL IMAGE PROCESSING [ICE 4021]

Time: 3 Hours

MAX. MARKS: 50

	Instructions to Candidates:
*	Answer ALL the questions.
*	Missing data may be suitably assumed.

1A.	What are the fundamental steps in image processing?	4
1 B .	Compare image processing and analysis with suitable examples	3
1C.	What are the different levels in image processing?	3
2A.	Draw the structure of image formation model. Explain the importance of brightness	4
	adaptation in image processing.	
2B.	What are the basic sensor arrangements for acquiring an image?	3
2C.	What are the effect of change in spatial and gray Level resolutions on an image?	3
3A.	Explain bilinear transformation and nearest neighbor interpolation with examples.	3
3B.	What is histogram matching? Compute the histogram equalization for the following	4
	probabilities having eight gray levels. B = {0.19, 0.25, 0.21, 0.16, 0.08, 0.06, 0.03,	
	0.02}.	
3C.	With mathematical expressions explain harmonic and contra harmonic filter. Which	3
	type of degradation can be removed using these two techniques?	
4A.	What are the types of special smoothing filters? Explain each type with examples	3
4B.	With the help of functional block diagram explain active processing stages of Lossy	3
	compression and decompression technique.	
4C.	What are lossless compression techniques? Compute the Huffman coding for the	4
	following probability distribution. $A = \{0.4, 0.3, 0.1, 0.1, 0.06, 0.04\}$	
5A.	Design a multi-dimensional data processing pipeline for object detection system for	5
	the following specification. Image samples are 100 of size 256×256 pixels (single	

- channel) belongs to two categories. Use wavelet transform up to third level and texture features. Also explain each stage in detail.
 5D Weite e doet note on the following with ensured as:
- 5B. Write a short note on the following with examples:1. Discrete cosine transform 2. Discrete wavelet transform

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