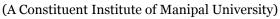
Reg. No.									
----------	--	--	--	--	--	--	--	--	--



Manipal Institute of Technology, Manipal





VI SEMESTER B.TECH (COMPUTER SCIENCE AND ENGINEERING) END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: DIGITAL IMAGE PROCESSING [CSE 320]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ANY FIVE FULL questions.
- ✤ Missing data, if any, may be suitably assumed.

1A.	Explai	n how the images are acquired using Gamma Rays, X-Rays, Microwave	s and					
	Radio	waves.	4M					
1 B .	Descri	be the process of Digitization of an image.	3M					
1C.	C. How do you define spatial and intensity resolution of an image? What happens resolutions are varied? Suggest minimum possible spatial and intensity resolu proper visualization by humans.							
2A.	With respect to histogram processing, explain histogram equalization.							
2B.	Explai	n the following intensity transformation functions.	2M					
	(i)	Bit plane slicing						
	(ii)	Gray level slicing						
2C.	Explai	in the concept of spatial filtering for image enhancement.	4M					
3A.	Give the mathematical formulation for fourier transform pair $f(x,y)$ and $F(u,v)$. Also show							
	that at $u=v=0$, Fourier transform is equal to the average gray level of the image. 2M							

3B.	Give the steps involved in filtering an image in frequency domain. Also list out the								it the		
	properties o	of freque	ncy dor	nain filt	ering.						4M
3C.	Explain Homomorphic filtering.								4M		
4A.	Prove that morphological dilation and erosion are duals of each other with respect to the								to the		
	set complementation and reflection. Also provide any three properties of each.								4M		
4B.	How are operations like dilation and erosion used in image smoothing, finding grad								dient,		
	Top-hat and Bottom-hat transformations of gray scale image? 3M										
4C.	C. Explain the following types of redundancies.							3M			
	(i) Coding	(ii) Int	erpixel	(iii) l	Psychov	visual					
5A.	Explain Canny's method to detect edges.										5M
5B.	B. Consider the simple 4×8, 8-bit image:								5M		
		21	21	21	95	169	243	243	243		
		21	21	21	95	169	243	243	243		
		21	21	21	95	169	243	243	243		
		21	21	21	95	169	243	243	243		
	(i) Compute the entropy of the image.										

(ii) Compress the image using Huffman coding.

(iii) Compute the compression achieved and effectiveness of Huffman coding.

- 6A. Describe probability density functions for the following types of noise. Also plot the PDF for each. (i) Gaussian noise (ii) Rayleigh noise (iii) Gamma noise (iv) Exponential noise (v) Salt and Pepper noise 5M
- 6B. Describe different types of thresholding. Provide the steps to automatically compute global threshold. 5M