Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2161604 **Date:17/05/2016**

Subject Name: Image processing

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What is histogram? Explain histogram equalization algorithm. Write pseudo code or Matlab code for calculation of histogram and histogram equalization.	**07**
	(b)	Explain Translation and Scaling operations used in image processing with suitable example and application.	**07**
Q.2	**(a)**	Define the following terms with respect to image. Neighbor of a pixel, Adjacency, Resolution of a image, Nearest neighbor interpolation, Contrast Strecthing, Digital Image, Image Negative	**07**
	(b)	Write a Short note on: Image Sampling and Quantization.	**07**
		OR	
	(b)	Draw and Explain structure of human eye and discuss human vision system	**07**
Q.3	**(a)**	Write a short note: smoothing filter in frequency domain.	**07**
	(b)	Explain different noise model in image.	**07**
		OR	
Q.3	**(a)**	What is wavelet? Explain how wavelet transform is used to decompose image with help of block diagram	**07**
	(b)	Explain Butterworth low-pass and high-pass frequency responses and their implementation in 2D spectral domain.	**07**
Q.4	**(a)**	What is redundancy? What are the different types of redundancy available in the digital image? Explain inter-pixel redundancy.	**07**
	(b)	Consider that image is corrupted by Gaussian noise. Suggest suitable method to minimize Gaussian noise from the image. Explain that method and write Matlab/Scilab code for the same.	**07**
		OR	
Q.4	**(a)**	Write a detailed note on 2-D fast wavelet transform.	**07**
	(b)	Explain the concept of Laplacian and LoG for edge detection and comment on the comparison of both the operators.	**07**
Q.5	**(a)**	What is pseudo color image processing? Explain intensity slicing of color image.	**07**
	(b)	What is Segmentation? List segmentation approaches. Explain use of gradient operators to find out discontinuies.	**07**
		OR	
Q.5	**(a)**	What is morphology? Discuss two basic morphological operations Erosion and Dilation. Write two applications of Erosion and Dilation	**07**
	(b)	What is importance of Hough transform in image processing? Write steps of Hough transform for XY plane. Explain problem of Hough Transform in XY plane for vertical line.	**07**

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