

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VIII • EXAMINATION – SUMMER 2013

Subject Code: 181102**Date: 09/05/2013****Subject Name: Fundamentals of 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) Explain basic processes involved in generation of digital image. Explain different digital image file formats **07**
- (b) Explain basic difference between point processing and mask processing. Generating negative image is point process or mask process? Explain Pseudo code for the generation of negative image for 256 gray level digital image. **07**

- Q.2** (a) Consider that text is written using black ink on a paper of bad quality having so many light yellow dots and wrinkles on it. We want to scan the paper and improve appearance of text material written on it. Show suitable image processing method and Pseudo code for the same. **07**
- (b) Consider that image is corrupted by salt and pepper noise. Suggest better method to remove salt and pepper noise from the image. Explain that method and write Matlab/Scilab code for the same. **07**

OR

- (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**
- Q.3** (a) Explain importance of histogram in image processing. Explain Pseudo code to calculate histogram. Explain histogram equalization. **07**
- (b) What is wavelet? Explain how wavelet transform is used to decompose image with help of block diagram **07**

OR

- Q.3** (a) Explain basic steps for filtering of image in frequency domain. What are the filter mask used for low pass filtering and high pass filtering? **07**
- (b) Explain spatial filtering process. Write MATLAB code for convolution of 3x3 filter mask with image of size MxN. Write 3x3 mask for low pass filtering and high pass filtering. **07**

- Q.4** (a) Discuss reasons for the degradation of digital image. Explain image degradation-restoration model with equations in Spatial and frequency domain. **07**
- (b) Explain RGB and YCbCr color models. Discuss transformation from RGB to YCbCr. **07**

OR

- Q.4** (a) Explain different noise probability density functions using mathematical expressions and graphs. **07**
- (b) Explain region growing by pixel aggregation method. **07**

- Q.5** (a) What is segmentation? List segmentation approaches. Explain use of gradient operators to find out discontinuities. **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**

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 are lossless compression techniques? Explain Huffman encoding with suitable example. **07**
