

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII(NEW) • EXAMINATION – WINTER 2016

Subject Code:2171712**Date:29/11/2016****Subject Name: Image Processing (Departmental Elective - II)****Time:10.30 AM to 1.00 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)** Answer the following questions **07**
- (1) What are the applications of image processing in process industries?
 - (2) Which statistical filter is most suitable to remove salt and pepper noise from the digital image?
 - (3) What is pattern? What are common pattern arrangements used for object recognition?
 - (4) 100x100 pixel image is having 256 gray levels. What is the transmission rate required to transmit this image in one second?
 - (5) Write 3x3 mask for Sobel Edge detection
 - (6) Write 3x3 mask for high pass spatial filtering
 - (7) What is inverse square law ?
- (b)** Write Pseudo-code or code in SCILAB/MATLAB for the following image processing operation (Do not use standard functions) **07**
- (1) Find average intensity of the given image
 - (2) Edge detection using Prewitt mask
- Q.2 (a)** Discuss basic concepts of image sampling and quantization with suitable examples and sketches. **07**
- (b)** Find out storage requirements in to store 100 true color images (24 bits per pixel) where each image has size of 1024x1024 pixels. What is transmission time required to transmit all these 100 images using internet speed 2 MBPS **07**
- OR**
- (b)** Explain necessity of image compression. Discuss different types of redundancies exploited for the image compression. **07**
- Q.3 (a)** Explain piecewise linear transformation functions [1] Contrast stretching & [2] Intensity level slicing. Give two application examples of such transforms. **07**
- (b)** What is importance of histogram? How histogram equalization is done? Explain algorithm for histogram equalization. **07**
- OR**
- Q.3 (a)** Explain 2D convolution with example. How 2D convolution is useful for digital image processing? **07**
- (b)** Explain image sharpening with frequency domain filtering. **07**
- Q.4 (a)** What is image segmentation? Explain difference between first order and second order edge detection technique? **07**
- (b)** Explain edge linking using global processing with Hough transform. **07**
- OR**
- Q.4 (a)** Explain arithmetic coding technique for loss-less data compression. What is advantage of arithmetic coding technique over Huffman coding technique? **07**

- (b) Explain Pseudo-color image processing. What is the application of pseudo-color image processing? **07**
- Q.5** (a) Explain morphological algorithm for converting an 8 connected binary boundary to m-connected boundary assuming that boundary is fully connected and one pixel thick. **07**
- (b) Discuss Bayes classifier for Gaussian pattern classes. **07**
- OR**
- Q.5** (a) Discuss minimum distance classifier technique for matching. **07**
- (b) Explain image restoration using MMSE (Minimum Mean Square Error) technique. **07**
