Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Regular Examination January / February 2011

Subject code: 710404 N

Subject Name: Image Processing

Date: 04 /02 /2011 **Time: 02.30 pm – 05.00 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 procedure for Image sampling and quantization. **07**

(b) Write a brief note on the application of digital image processing. **07**

Q.2 **(a)** Explain the different models of color image. **07**

(b) Define the Histogram of an image. Consider the following 2-bit image of size 5 x 5. For L=4 (intensity level) Find out the histogram component and average intensity value. **07**

$$A = \begin{matrix} 0 & 0 & 1 & 1 & 2 \\ 1 & 2 & 3 & 0 & 1 \\ 3 & 3 & 2 & 2 & 0 \\ 2 & 3 & 1 & 0 & 0 \\ 1 & 1 & 3 & 2 & 2 \end{matrix}$$

OR

(b) Illustrate the histogram equalization and intensity distribution for a 3 bit image of size 64x64 pixel having 8 intensity levels. **07**

r_k	r_0	r_1	r_2	r_3	r_4	r_5	r_6	r_7
n_k	790	1023	850	656	329	245	122	81

Where r_k is an intensity level and n_k is the number of pixel having intensity value r_k .The image has intensity levels in the range of [0, 7].

Q.3 **(a)** Explain the various Point Processing technique used in image enhancement. **07**

(b) What is image smoothening? Explain smoothing spatial filters. **07**

OR

Q.3 **(a)** Explain the frequency domain filtering. **07**

(b) Explain wiener filter. Also compare it with Inverse filter. **07**

Q.4 **(a)** Write a short note on Discrete Wavelet Transform. **07**

(b) Define the basic relationships between the pixels. Also explain the different distance measures of pixels. **07**

OR

Q.4 **(a)** Define a model of Image restoration. Also explain the different noise Probability Density functions. **07**

(b) Explain the structure of H.26x. **07**

Q.5 **(a)** Illustrate the process of Image sharpening. **07**

(b) Explain Piecewise Linear Transformation functions. **07**

OR

Q.5 **(a)** Give Summary of Morphological operations on Binary Images. **07**

(b) Explain the following terms: (1) JPEG 2000 (2) MPEG Standard. **07**

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