Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013

Subject code: 1720104 **Date: 31-12-2013**

Subject Name: Digital Image Processing

Time: 10.30 am – 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 following terms related to digital image processing **07**

(1) Sampling (2) Quantization (3) Spatial and intensity resolution

(b) Explain how the linear filtering of an image is performed through Convolution-mask. Find the result of smoothing operation of the following image block of size 5x5 through an averaging mask of size 3x3. **07**

10	20	40	50	60
30	200	20	40	80
40	05	10	90	100
70	240	230	80	10
80	10	20	70	150

Q.2 **(a)** Define Histogram. Briefly explain applications of histogram in image enhancement and image segmentation **07**

(b) Briefly explain bit plane slicing and gray level slicing for image enhancement **07**

OR

(b) Briefly explain different methods of edge detection **07**

Q.3 **(a)** Find out the Discrete Fourier Transform (DFT) of the following image **07**

3	0	0
0	3	0
0	0	3

(b) Briefly explain model of the image restoration. Explain representation of restoration in spatial domain and frequency domain **07**

OR

Q.3 **(a)** Briefly explain Homomorphic filtering. Mention advantages of Homomorphic filtering **07**

(b) Briefly explain Wiener and inverse filtering **07**

Q.4 **(a)** Briefly explain Pseudocolor Image processing techniques **07**

(b) Briefly explain Bottom-hat and Top-hat morphological operations. Also explain its applications **07**

OR

Q.4 **(a)** Briefly explain following applications of morphological operations **07**

(1) Boundary detection (2) Hole filling (3) Thinning

(b) Briefly explain Region growing and Region splitting-merging algorithm **07**

Q.5	**(a)**	Briefly explain Morphological filter to remove noise and Morphological Gradient to detect edges	**07**
	(b)	Briefly explain different types of Redundancy. Briefly explain JPEG compression method.	**07**

OR

Q.5	**(a)**	Briefly explain Wavelet and its applications	**07**
	(b)	Briefly explain image segmentation based on motion. Explain use of Absolute accumulative difference image (ADI), Positive ADI and Negative ADI	**07**

****