

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**
