

GUJARAT TECHNOLOGICAL UNIVERSITY**BE SEM-VII Examination-Nov-2011****Subject code: 170307****Date: 29/11/2011****Subject Name: Image Processing****Time: 10.30 am -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) Explain the fundamental steps and objective of each step in digital Image processing in brief. **06**
- (b) Explain following terms in reference of image processing **06**
- Image resolution
 - Mach-band effect
 - Simultaneous contrast
- (c) Explain the image formation model. **02**

- Q.2** (a) What are 4, 8 and m-adjacency of the pixels? Find 4-8-and m-adjacency between pixel p and q of following figure for $V = \{0, 1\}$. **06**

	3	1	2	1(q)
	2	2	0	2
	1	2	1	1
(p)	1	0	1	2

- (b) What is the difference between image enhancement and image restoration? Explain following gray level transformation for image enhancement in spatial domain **08**
- Log transformation
 - Power-Law transformation.

OR

- (b) Prove that multiplication of input image $f(x,y)$ with $(-1)^{x+y}$ is required to bring the image at center point in frequency domain. **06**

- Q.3** (a) Why Laplacian mask coefficient sum is zero? Discuss the effects on resultant image by applying the Laplacian filter in frequency domain. **07**
- (b) Explain various masks which are used for Line detection image discontinuity segmentation algorithm. **07**

OR

- Q.3** (a) Explain DFT and DCT with their applications in image processing field. **07**
- (b) Explain ramp edge detection techniques and discuss what will be the effect of ramp slope on the resultant image. **07**

- Q.4** (a) Explain the Dilation and Erosion morphological operations. **07**
- (b) Explain the various ways through which we can achieve image compression. **07**

OR

- Q.4** (a) Explain Opening and Closing morphological operations. **07**

(b) What are the fidelity criteria to assess the loss during the image compression? **07**

Q.5 (a) Explain Huffman coding techniques with suitable example. **07**

(b) Explain 4 direction chain code techniques for boundary representation with suitable example **07**

OR

Q.5 (a) Explain JPEG. **07**

(b) Explain 8 direction chain code techniques for boundary representation with suitable example **07**
