

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014****Subject code: 1720104****Date: 20-06-2014****Subject Name: Digital Image Processing****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 Sampling and quantization with example. Discuss types of adjacency with example **07**
 (b) Define wavelet. Explain Image Pyramid in detail. **07**
- Q.2** (a) Describe the process of convolution and correlation with example. **07**
 (b) Describe steps for filtering in the frequency domain. Explain sharpening frequency domain filters in detail **07**

OR

- (b) Equalize the given histogram **07**
- | | | | | | | | | |
|---------------|-----|------|-----|-----|-----|-----|-----|----|
| Grey | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| No. of pixels | 790 | 1023 | 850 | 656 | 329 | 245 | 122 | 81 |
- Q.3** (a) What effect would set to zero the higher order bit planes have on the histogram of an image in general? **07**

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

- (b) Explain noise. How you can classify noise. Describe various noise models. **07**
- Q.3** (a) Explain Segmentation using HIS and RGB Model. Which would yield better results? **07**
 (b) Explain image enhancement by point processing. **07**
- Q.4** (a) Explain lossy image compression technique and discuss any one of them. **07**
 (b) Explain Haar transform and subband coding in detail **07**

OR

- Q.4** (a) Explain region extraction in detail. **07**
 (b) Compare between contrast stretching and histogram equalization. **07**
- Q.5** (a) Develop a procedure for computing the median in $n \times n$ neighborhood. State and explain the features of median filtering. **07**
 (b) Explain Robert, Prewitt and Sobel Operator in detail **07**

OR

- Q.5** (a) Explain erosion, dilation and prove duality theorem. **07**
 (b) Given a 7 x 7 image, make use of the Hit or Miss transform to find the top edge of the 5 x 5 square. **07**

0	0	0	0	0	0	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	0	0	0	0	0	0

Use the two structuring elements (B1 AND B2) as shown below:

0	0	0
0	1	0
0	1	0

0	1	0
0	0	0
0	0	0
