

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E –IIst SEMESTER–EXAMINATION – JULY- 2012****Subject code: 1710404****Date: 10/07/2012****Subject Name: Image Processing****Time: 10:30 am – 13:00 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) (i) Discuss the portion of EM spectrum other than visible range in context with imaging modalities with their suitable example of applications. **04**
(ii) Write a short note on Hough Transform. **03**
(b) A CCD camera chip of dimension 14×14 mm and having 2048×2048 elements, is focused on square flat area located 0.5 m away. The camera is equipped with 35 mm lens. How many line pairs per mm will this camera be able to resolve? **07**
- Q.2** (a) (i) Explain image transformation techniques related to the coordinates of image. **04**
(ii) Write a short note on principal component analysis. **03**
(b) (i) Explain with mathematics and example, horizontal shear of image. **03**
(ii) What do you mean by the word “texture”? Discuss two measures for it. **04**
- OR**
- (b) (i) Explain with mathematics and example, vertical shear of image. **03**
(ii) What do you mean by the word “co-occurrence matrix”? Discuss the use of it. **04**
- Q.3** (a) Explain the importance and effect of bin width in context with image histogram. **07**
(b) Explain contrast stretching method with non-linear operation. **07**
- OR**
- Q.3** (a) Explain the importance and effect of contrast in context with image histogram. **07**
(b) Explain contrast stretching method with linear operation. **07**
- Q.4** (a) (i) Explain with mathematics and example, the use for convolution in image processing other than image filtering. **04**
(ii) Write a short note on inverse filtering. **03**
(b) Discuss the effect of the size of filter mask in the spatial domain filtering on the border of the resulting image. **07**
- OR**
- Q.4** (a) (i) Explain with mathematics and example, the use for correlation in image processing other than template matching. **04**
(ii) Write a short note on winner filtering. **03**
Q.4 (b) Discuss the effect of the size of filter coefficients in the frequency domain filtering on the resulting image. **07**
- Q.5** (a) (i) Explain line detection with masks for horizontal and vertical lines. **05**
(ii) Write a short note on closing operator. **02**
(b) Mention methods for lossless image compression technique. Discuss any one of them. **07**
- OR**
- Q.5** (a) (i) Explain edge detection with gradient operator. How we can find diagonal edges with gradient operator. **05**
(ii) Write a short note on opening operator. **02**
(b) Mention methods for lossy image compression technique. Discuss any one of them. **07**
