Seat No.: _____ Enrolment No._____

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 dimension14 × 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 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 starching 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 starching 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**

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