Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II(Old course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 1710404 **Date: 11/12/2015**

Subject Name: Image Processing

Time:2:30 pm to 5:00 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)** Distinguish between spatial domain techniques and frequency domain techniques of Image enhancement. Explain any two basic gray level transformations used in spatial domain with necessary equations. **07**

(b) Draw and explain the model of image degradation and restoration process and also write the expression of PDF for any three noise model. **07**

Q.2 **(a)** Explain non parametric and model based approach for edge detection. **07**

(b) Apply histogram equalization and sketch the histograms of the original image and the histogram equalized image. **07**

r_k	0	1	2	3	4	5	6	7
n_k	8	10	10	2	12	16	4	2

OR

(b) Compute the 2D DFT of the 4X4 grayscale image f(x,y) shown below: **07**

1	2	3	4
5	6	7	8
1	2	3	4
5	6	7	8

Q.3 **(a)** Write a note on homomorphic filtering with the help of suitable derivations. **07**

(b) Explain different types of connectivity with suitable example. Also write a note on different types of distance measure. **07**

OR

Q.3 **(a)** Describe the maximum entropy based method for image restoration. **07**

(b) Explain MMSE (Weiner) filter to remove the noise from the image with necessary equations. **07**

Q.4	**(a)**	Discuss Image smoothing and Image sharpening with suitable example. What will be the effect of changing the mask size?	**07**
	(b)	Explain various frequency domain filtering techniques for image enhancement.	**07**

OR

Q.4	**(a)**	Enlist the two dimensional orthogonal transforms. Explain any one in detail.	**07**
	(b)	Write a short note on Image Texture analysis.	**07**
Q.5	**(a)**	Answer the following questions.	
		i) Enlist basic morphological operators and explain any one in detail.	**04**
		ii) Explain morphological Hit and Miss Transformation.	**03**
	(b)	Explain the following in brief.	
		i) JPEG 2000	**04**
		ii) H.26x standards	**03**

OR

Q.5	**(a)**	What is thresholding? Explain global thresholding method used for image segmentation.	**07**
	(b)	Explain the concept of edge linking using Hough transform.	**07**

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