Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII • EXAMINATION – WINTER • 2014

Subject Code: 181102 Date: 25-11-2014

Subject Name: Fundamentals of 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)**	(i) How do you convert analog image to digital?	**02**
		(ii) "Adding image with itself makes image brighter" Justify.	**02**
		(iii) List the types of noise and their cause, which can corrupt an image.	**03**
	(b)	List the different areas of image processing applications with examples.	**07**
Q.2	**(a)**	Explain Translation and Scaling operations used in image processing with suitable example and application.	**07**
	(b)	With reference to image processing, briefly explain following terms: (i) 4-connected path (ii) Dynamic range (iii) False contouring	**07**
		OR	
	(b)	With reference to image processing, briefly explain following terms: (i) Match band (ii) Brightness adaption (iii) Contrast	**07**
Q.3	**(a)**	"Multiplying the image with $-1^{(x+y)}$ in spatial domain leads to shift of 2-D Fourier Transform to the centre." Justify the statement with suitable example.	**07**
	(b)	Write MATLAB code to flip gray image horizontally.	**07**
		OR	
Q.3	**(a)**	Enlist the methods to increase the dynamic range of an image. Explain any one method in detail.	**07**
	(b)	Write MATLAB code to perform bit-plane slicing of gray image.	**07**
Q.4	**(a)**	What is limitation of median filter? How adaptive median filter enhances working of median filter? Explain in detail.	**07**
	(b)	Explain in detail the RGB color model. What is the Hex number for brightest possible red?	**07**
		OR	
Q.4	**(a)**	Explain in brief: (i) Contra-harmonic mean filter (ii) Alpha-trimmed mean filter.	**07**
	(b)	Write short note on 2-D wavelet transform.	**07**
Q.5	**(a)**	Prove that opening and closing are duals of each other.	**07**
	(b)	Write short note on LZW coding.	**07**
		OR	
Q.5	**(a)**	List various morphological operations used in image processing with their specific applications.	**07**
	(b)	Show that the Laplacian operator is invariant to rotation.	**07**

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