Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II (Old course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code1720104 Date:14/05/2015

Subject Name: Digital Image Processing

Time: 02:30 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)**	Give few applications of 2D convolutions in the field of image processing.	**07**
	(b)	Can two different images have the same histogram? Justify your answer. What does the standard deviation of a histogram tell us about the image?	**07**
Q.2	**(a)**	Explain nonlinear gray-level transformations in detail.	**07**
	(b)	Find the following image using a 3 X 3 neighborhood averaging by assuming (a) zero padding and (b) pixel replication	**07**

$$\begin{vmatrix} 1 & 2 & 3 & 2 \\ 4 & 2 & 5 & 1 \\ 1 & 2 & 6 & 3 \\ 2 & 4 & 6 & 7 \end{vmatrix}$$

OR

	(b)	Explain local or neighborhood operation in spatial domain with suitable example.	**07**
Q.3	**(a)**	Explain steps for Haar Transform for N=2.	**07**
	(b)	Compare canny edge detector with the Laplacian of Gaussian edge detector.	**07**

OR

Q.3	**(a)**	Explain the principle of the following region-based segmentation procedures and also the difference do you find in these three approaches? (a) Region growing (b) Region splitting (c) Split and merge	**07**
	(b)	Explain image enhancement techniques in the frequency domain.	**07**
Q.4	**(a)**	Explain why watershed segmentation tends to over-segment images. Also mention one solution to overcome the problem of over segmentation.	**07**
	(b)	Define structuring element. Explain the major effects of the erosion and dilation process with suitable example.	**07**

OR

Q.4	**(a)**	Mention the properties of the following morphological operations. (a) opening and closing operation (b) Hit-or-miss transform	**07**
	(b)	What is the goal of image restoration technique? Explain noise models and image restoration techniques in detail.	**07**
Q.5	**(a)**	Explain any two color model and segmentation techniques in detail.	**07**
	(b)	Explain any two lossy image compression techniques in detail.	**07**

OR

Q.5	**(a)**	Explain the properties of convex hull, thinning and thickening morphological operation in detail.	**07**
	(b)	Define Wavelet. What is the goal of image pyramid and sub-band coding?	**07**

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