Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 710404N **Date: 04-12-2014**

Subject Name: Image Processing

Time: 10:30 am - 01:00 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 a digital image is represented? Explain 2-D sampling theory in brief. **07**

ii) Define Spatial and Intensity resolution. How these two parameters interact in determining perceived image quality? What is false contouring?

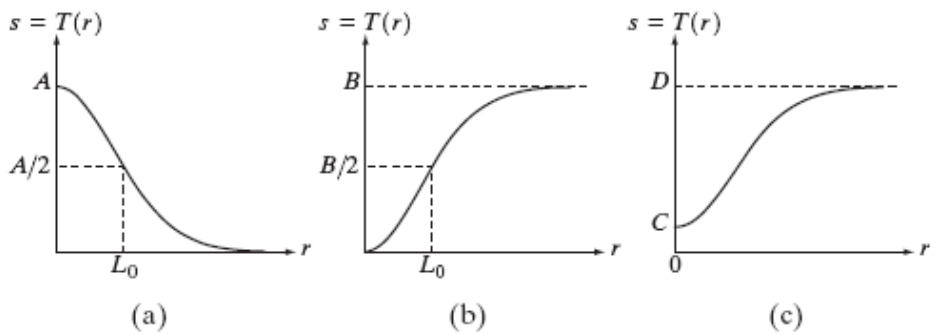
(b) Consider the image segment shown in below figure **07**

(i) Let V={0,1} and compute the lengths of the shortest 4-,8- and m-path between p and q

(ii) Repeat for V={1,2}

3	1	2	1 (q)
2	2	0	2
1	2	1	1
1 (p)	0	1	2

Q.2 **(a)** Exponentials of the form with α a positive constant, are useful for constructing smooth gray-level transformation functions. Start with this basic function and construct transformation functions having the general shapes shown in the following figures. The constants shown are input parameters, and your proposed transformations must include them in their specification. (For simplicity in your answers, L_0 is not a required parameter in the third curve.) **07**



(b) Explain the different gray level transformation techniques for image enhancement in brief. **07**

OR

(b) Define the histogram equalization and specifying the drawbacks of same, explain how it can be overcome by using histogram specification. **07**

Q.3 **(a)** Prove that image averaging operation removes noise from image. **07**

	(b)	Draw the block diagram of Image enhancement in frequency domain and explain in brief.	**07**
		OR	
Q.3	**(a)**	Explain homomorphic filtering in detail.	**07**
	(b)	Explain the following terms: (1) JPEG 2000 (2) MPEG Standard.	**07**
Q.4	**(a)**	Define a model of Image restoration. Also explain the different noise Probability Density functions.	**07**
	(b)	Explain image restoration in presence of noise for spatial filtering.	**07**
		OR	
Q.4	**(a)**	Explain the Hit or Miss transformation.	**07**
	(b)	Explain image opening and closing operation with necessary example and prove that these operations overcome the drawbacks of dilation and erosion operation.	**07**
Q.5	**(a)**	What do you meant by Color model? List the application of each color model. Explain any one color model in brief.	**07**
	(b)	Write a short note on Discrete Wavelet Transform.	**07**
		OR	
Q.5	**(a)**	What is Hough transform? Explain its importance for edge linking.	**07**
	(b)	Explain region growing and region splitting operation for image segmentation.	**07**

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