Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –I Examination Feb. - 2012

Subject code: 712603N **Date: 17/02/2012**

Subject Name: Digital Image Processing and Pattern Recognition

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)** Answer the following.

(i) "4-connected path are always m-connected path." State TRUE/FALSE and justify. **02**

(ii) Explain concept of simultaneous contrast and match band. **03**

(iii) "Laplacian highlights gray-level discontinuities in image and deemphasizes regions with slowly varying gray-levels." Justify. **02**

(b) Justify the necessity of image enhancement. Explain in detail with application, contrast stretching and gray-level slicing. **07**

Q.2 **(a)** Give the procedure steps for filtering an image in frequency domain. Show the correspondence of the filtering in frequency domain to the spatial filtering. **07**

(b) What is histogram processing? Explain histogram equalization technique. **07**

OR

(b) Explain the use of adaptive, local noise reduction filter with an example. **07**

Q.3 **(a)** Give the equations for DFT and inverse DFT for images and based on these equations show that the reconstruction is lossless. **07**

(b) Explain with merits and demerits of the GIF and JPEG image file format. **07**

OR

Q.3 **(a)** Differentiate degradation and noise. Explain methods for estimating noise parameters. **07**

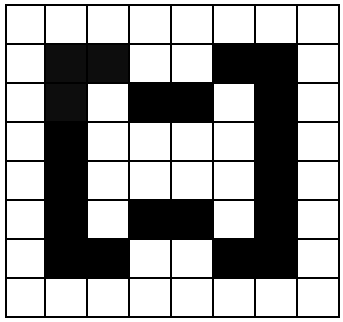
(b) Explain each of the components of the following color models: RGB, CMY and HSI. State where these color models are applied primarily. **07**

Q.4 **(a)** Define coding redundancy. Generate a tag using arithmetic coding procedure to transmit the word 'INDIA'. **07**

(b) Discuss importance of wavelet transform in digital image processing. **07**

OR

Q.4 **(a)** Apply region filling algorithm on given image and explain each step. Assume suitable structuring element. **07**



	(b)	Explain with example the significance of gradient and laplacian operators in image segmentation.	**07**
Q.5	**(a)**	Discuss the connected component extraction algorithm with an example.	**07**
	(b)	Explain in detail with basic formulation of region based segmentation.	**07**
		OR	
Q.5	**(a)**	Write short note on video coding standards.	**07**
	(b)	Justify the necessity of image descriptors. Explain with example any one boundary descriptor.	**07**

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