Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER - V EXAMINATION - WINTER 2015

Subject Code: 650011 **Date:10/12/2015**

Subject Name: Image Processing (IP)

Time:10.30 am to 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)** What is Digital Image Processing? Discuss any four applications of Digital Image Processing. **07**

(b) 1. Explain components of an Image Processing System. **05**

2. Discuss following terminologies: **02**
   - A. Monochromatic Light
   - B. Chromatic Light

Q.2 **(a)** Discuss simple Image Formation Model in detail. **07**

(b) Explain following: **07**
   1. Image Sampling
   2. Image Quantization

OR

(b) 1. List any three mathematical tools used in Digital Image Processing. **01**

2. Explain following basic Intensity Transformation Functions: **06**
   - A. Log Transformations
   - B. Gamma Transformations

Q.3 **(a)** Write a short note on Histogram Matching. **07**

(b) Discuss Sampling Theorem in brief. **07**

OR

Q.3 **(a)** 1. Explain Unsharp Masking and Highboost Filtering in brief. **05**

2. List any two properties of the 2-D Discrete Fourier Transform. **02**

(b) What is Aliasing? Explain it in detail. **07**

Q.4 **(a)** Explain Correspondence between Filtering in the Spatial and Frequency Domains. **07**

(b) 1. Which characteristics are generally used to distinguish one color from another? **02**

2. Explain RGB Model in detail. **05**

OR

Q.4 **(a)** Discuss following Frequency Domain Filters used in Image Smoothing: **07**
   1. Ideal Lowpass Filters
   2. Butterworth Lowpass Filters
   3. Gaussian Lowpass Filters

(b) 1. Write the formula for following: **06**
   - a. Converting colors from HSI to RGB
   - b. Converting colors from RGB to CMY
   - c. Converting colors from RGB to HSI

2. What is Coding Redundancy? **01**

Q.5 **(a)** Write down rating scale of the Television Allocations System Organization. **07**

	(b)	1. Explain Block Transform Coding.	**03**
		2. What are the three fundamental steps required for edge detection?	**04**
		OR	
Q.5	**(a)**	Write any seven Internationally sanctioned image compression standards with organization name and descriptions.	**07**
	(b)	Write a short note on Optimum Global Thresholding Using Otsu's Method.	**07**

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