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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2161604 **Date: 08/05/2017**

Subject Name: Image processing

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.**

MARKS

Q.1 **Short Questions** **14**

1 Define Digital Image Processing.

2 Explain Monochromatic light and Chromatic light.

3 How much storage capacity is required to store image with size of 1024x768 and 256 gray levels.

4 How to calculate distance between pixels.

5 Write a code to find Image Negative.

6 Compare Performance of Log Transformation and Power-Law Transformation.

7 List few real time applications where image processing has been used.

8 Why frequency domain is used?

9 Discuss Neighbors of a pixel.

10 Explain Nearest neighbor interpolation

11 Write any 3x3 mask for high pass filtering of an image.

12 What is safe color concept?

13 Explain lossy and lossless compression.

14 Discuss behavior of first and second order derivative ehwn applied to an image.

Q.2 **(a)** List Different type of File Formats Available to Represent an Image. **03**

(b) List and Explain Components of an Image Processing System. **04**

(c) Explain basic concepts of image sampling and quantization. Discuss spatial and Intensity resolutions. **07**

OR

(c) Segment the following image into two regions, clearly depicting the boundary based on the histogram. Include all essential calculation of Histogram. **07**

3	2	0	8	7
2	3	1	8	7
2	2	1	8	7
7	7	7	8	8
6	6	6	6	5

Q.3 **(a)** Discuss process of spatial filtering and discuss its applications. **03**

(b) Explain Piecewise-Linear Transformation Functions in detail. Write matlab code for any one method discussed. **04**

(c) Explain Smoothing Filters in detail. **07**

OR

Q.3	**(a)**	What is histogram? Explain all possible types of histogram.	**03**
	(b)	Explain DFT and DCT with their applications in image processing field.	**04**
	(c)	Write a Short Note on Spatial Correlation and Convolution.	**07**
Q.4	**(a)**	Define term Restoration. Mention few applications of Restoration.	**03**
	(b)	Explain any four Noise Probability Density Functions.	**04**
	(c)	What is the difference between degradation and noise? Explain image degradation and restoration model.	**07**

OR

Q.4	**(a)**	Explain Adaptive filters.	**03**
	(b)	Explain Periodic Noise Reduction by Frequency Domain Filtering.	**04**
	(c)	Explain HSI color model with all essential figure and equation.	**07**
Q.5	**(a)**	List applications of RGB, HIS and CMYK color Models.	**03**
	(b)	Explain Image Segmentation based on color.	**04**
	(c)	Define Image Compression. Explain Image Compression Model.	**07**

OR

Q.5	**(a)**	Discuss Spatial and Temporal Redundancy of an Image.	**03**
	(b)	Explain Haar Transform and mention its applications.	**04**
	(c)	Explain Image segmentation using Thresholding.	**07**

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