

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI(NEW) – EXAMINATION – SUMMER 2019****Subject Code:2161604****Date:21/05/2019****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.

**Q.1 (a) Define following terms: 03**

- (i) Resolution
- (ii) Kernel
- (iii) Contrast Stretching

**(b) Explain three levels of image processing processes. 04****(c) Explain the digitizing process of real world scene. 07****Q.2 (a) Define following terms: 03**

- (i) Simultaneous Contrast
- (ii) m-adjacency
- (iii) D4 Distance

**(b) List and Explain Components of an Image Processing System. 04****(c) What is Histogram? What is significance of Histogram Equalization? Explain process on Histogram equalization NxN size image. 07****OR****(c) Explain Bitplane slicing method of Image Representation. What is the significance of this method in image compression and information hiding? 07****Q.3 (a) (i) Histogram equalization always improves the visual appearance.(T/F) 03****(ii) Two different images of same size can have same histogram.(T/F)****(iii) Histogram Equalization is a Contrast Stretching Operation. (T/F)****(b) Explain Image Smoothing Filters in Spatial Domain. 04****(c) Explain use of derivatives in sharpening an image. derive all essential equations and mask elements. 07****OR****Q.3 (a) Which are the steps for performing image processing in frequency domain? 03****(b) Explain Image Sharpening Filters in Frequency Domain. 04****(c) What is the difference between degradation and noise? Explain image degradation and restoration model. 07****Q.4 (a) Explain image subtraction and image averaging method. 03****(b) Explain log transformation and negative transformation method. 04****(c) Why Pseudocolor image processing is required? What are the techniques to achieve pseudo image? List few applications of it 07**

**OR**

- Q.4** (a) What is significance of Color models? List applications of RGB, HIS and CMYK color Models. **03**
- (b) Explain spatial correlation and convolution with suitable example. Write all conclusions. **04**
- (c) Suggest an appropriate image restoration technique for the removal of following noise and explain the same in brief: 1. Salt and pepper noise 2. Salt noise 3. Pepper noise 4. Uniform noise **07**
- Q.5** (a) What is significance of DCT in Image processing? **03**
- (b) Explain JPEG Compression Model fundamental steps. **04**
- (c) Compare Fourier and wavelet transform. Mention applications of wavelet. Explain image pyramid in detail. **07**

**OR**

- Q.5** (a) Which type of redundancy can be found in images? **03**
- (b) Explain Image Segmentation based on color. **04**
- (c) Write a note on Optimum Global Thresholding Using Otsu's Method. **07**

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