

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER– II (Old course)• REMEDIAL EXAMINATION – SUMMER 2015****Subject Code: 1710404****Date:14/05/2015****Subject Name: Image processing****Time: 02:30 pm to 5:00 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 related to digital images **07**
 (1) pixel, (2) neighbors of a pixel, (3) adjacency (4) connectivity, (5) regions, (6) boundaries, (7) distance function
- (b) Describe image sampling and quantization process in detail. **07**
- Q.2** (a) What is image smoothening? Explain smoothing spatial filters. **07**
- (b) A common measure of transmission for digital data is the baud rate, defined as the number of bits transmitted per second. Generally, transmission is accomplished in packets consisting of a start bit, a byte (8 bits) of information, and a stop bit. Using these facts, calculate: **07**
- 1) How many minutes would it take to transmit a 1024 X 1024 image with 256 gray levels using a 56K baud modem?
 - 2) What should be the capacity in bits per second of channel if 25 images per second are to be transmitted in required time?
- OR**
- (b) What is bit-plane slicing? What effect would setting to zero the lower order bit planes have on the histogram of an image in general? What would be the effect on the histogram if we set to zero the higher-order bit planes instead? **07**
- Q.3** (a) Define the Histogram of an image. Consider the following 2-bit image of size 5 x 5. For L=4 (intensity level) Find out the histogram component and average Intensity value. **07**
- | | | | | |
|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 2 |
| 1 | 2 | 3 | 0 | 1 |
| 3 | 3 | 2 | 2 | 0 |
| 2 | 3 | 1 | 0 | 0 |
| 1 | 1 | 3 | 2 | 2 |
- (b) Explain the procedure of Histogram matching process for enhancement. **07**
- OR**
- Q.3** (a) How the discontinuity is detected in an image using segmentation? Explain various operators used for image segmentation based on edge detection. **07**
- (b) List out the color models for color image processing; also explain the RGB color model and how to convert RGB to HIS color model. **07**
- Q.4** (a) Define Thresholding. Discuss Basic Global Thresholding and Basic Adaptive Thresholding. **07**
- (b) Explain Minimum mean square error (wiener) filtering. How this filtering technique is different from inversing filtering? **07**
- OR**
- Q.4** (a) What do you mean by Image restoration? Is original Image can be restored? Justify your answer. **07**

- (b) Explain the shape detection using the morphological hit or mass transform. **07**
- Q.5** (a) Explain digital image compression standard JPEG and JPEG 2000. **07**
- (b) Explain morphological erosion and dilation of gray-scale images using flat and non-flat structuring element. Also discuss use of morphological operations for textural segmentation. **07**
- OR**
- Q.5** (a) Write a short note on Dilation and Erosion Morphological operations with suitable example. **07**
- (b) Write a short note on Hough transform. **07**
