

GUJARAT TECHNOLOGICAL UNIVERSITY
ME SEMESTER-I EXAMINATION – WINTER 2014

Subject Code:2712308**Date:12/01 /2015****Subject Name: IMAGE PROCESSING****Time: 2:30 Pm to 5:30 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) Write different types of adjacency (connectivity) and give short mathematical description of each. Write different types of distance measures and give short mathematical description of each. **07**
- (b) PDFs $Pr(0)$ to $Pr(7)$ for given images are 0,0.2,0.2,0,0.3,0.2,0.1,0 respectively and the PDFs $Pz(0)$ to $Pz(7)$ for target histogram are 0,0.1,0.2,0.1,0.1,0.2,0.2,0.1 respectively. Perform histogram matching technique to achieve the target histogram and specify the probability of each level after doing this procedure. **07**
- Q.2** (a) Define the term "Intensity resolution" and "Spatial Resolution" Explain *false contouring*. **07**
- (b) Explain Smoothing of an image using suitable mask. Explain what will be the effect of mask size on resultant image. **07**
- OR**
- (b) Distinguish between point operations and neighborhood operations. Is multiplication by a constant factor with an image called a neighborhood process? Write your views on the resultant image obtained after multiplication by a constant factor with an image. **07**
- Q.3** (a) Explain "gamma correction" process. $\gamma > 1$ in power law transformation is suitable for highly washed out bright appearance. Justify the statement. **07**
- (b) Write steps for filtering in the frequency domain. **07**
- OR**
- Q.3** (a) What are the frequency domain filters available to sharpen the image? Discuss any one practical image sharpening filter with mathematical description. **07**
- (b) Explain Inverse Filter process for restoration in brief. What is a drawback of this process? What can be done to overcome this drawback? **07**
- Q.4** (a) Explain HSI color model with necessary mathematical equations. **07**
- (b) What is pseudo color image processing? Explain intensity slicing of color image **07**
- OR**
- Q.4** (a) Explain basic global thresholding algorithm. **07**
- (b) Explain the difference between gradient and laplacian of an image. **07**
- Q.5** (a) Explain Hit or Miss Transformation of Morphological operations in detail. **07**
- (b) Explain Extraction of connected components approach. **07**
- OR**
- Q.5** (a) Explain Spatial and Temporal Redundancy. **07**
- (b) Explain Image pyramids approach. **07**
