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

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2170308 **Date: 02/05/2017**

Subject Name: Biomedical Image Processing

Time: 02.30 PM to 05.00 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)** Explain Rectangular and Non Rectangular image sampling in detail. **07**

(b) Explain image acquisition system. Write difference between CMOS and CCD image sensor. **07**

Q.2 **(a)** Write short note on Contrast stretching and Intensity slicing. **07**

(b) Describe Ringing effect. Explain Gaussian low pass and high pass filtering in frequency domain. **07**

OR

(b) Show the result of Horizontal and Vertical Sobel edge detection of given image. **07**

f(x,y) =

4	1	2
1	1	1
4	1	2

Q.3 **(a)** Explain Global and Adaptive thresholding technique for Image Segmentation. **07**

(b) 1) Define first and second derivatives. Find first and second derivatives of one dimensional image f(x) = 60 60 60 60 80 80 80 80. **07**

2) Explain Maxican Hat Operator.

OR

Q.3 **(a)** Explain canny edge detection method with merits. **07**

(b) Explain Region growing algorithm. Also show the results of the Region growing algorithm of given image. **07**

f(x,y) =

1	0	1	9	7
0	1	8	9	8
0	0	7	9	8
0	1	8	8	9
1	2	0	9	7

Q.4 **(a)** Explain Wavelet coding method for Image compression. **07**

(b) Describe Skeletons technique of Morphological image processing. **07**

OR

Q.4 **(a)** Explain Dilation and Erosion of binary image with example. **07**

(b) Explain Arithmetic coding for Image Compression. **07**

Q.5 **(a)** Explain Linear Hough Transform in detail. **07**

(b) Explain Chain code. **07**

OR

Q.5 **(a)** Describe types of Image features and Image moments. **07**

(b) Explain k-means clustering algorithm. **07**

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