Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2016

Subject Code:170307 **Date:05/05/2016**

Subject Name:Image Processing (Department Elective-I)

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 types of Image sensor. Write comparison between CCD and CMOS image sensor. **07**

(b) Explain following terms: 1) Luminance 2) Radiance 3) Brightness 4) Contrast 5) Intensity and Spatial Resolution 6) Modulation Transfer Function 7) Dynamic Range. **07**

Q.2 **(a)** Explain fundamental steps of Digital Image Processing. **07**

(b) Explain Image Digitization Process. **07**

OR

(b) Explain bit-plane slicing transformation for 8-bit image and give applications of it. **07**

Q.3 **(a)** Define Histogram. Explain Histogram Normalization and Equalization. **07**

(b) Explain Gamma Correction of Image. Also apply this transformation on 8-bit 3x3 input image f(x, y). **07**

$f(x, y) =$

10	20	5
30	40	30
20	30	40

OR

Q.3 **(a)** Explain High-Boost filtering and Unsharp Masking of image. **07**

(b) Perform Histogram Matching on the 8×8 image shown in below table: **07**

Image Gray Level Distribution								
Gray level (r_k)	0	1	2	3	4	5	6	7
No. of pixels (n_k)	8	10	10	2	12	16	4	2
Target Histogram								
Gray level (r_k)	0	1	2	3	4	5	6	7
No. of pixels (n_k)	0	0	0	0	20	20	16	8

Q.4 **(a)** Explain Non-linear Spatial filter with one example. **07**

(b) Write steps for filtering of image in frequency domain. Also explain ringing effect and Gaussian Lowpass Filter. **07**

OR

Q.4 **(a)** Explain in detail Linear Hough Transform. **07**

(b) Explain Canny Edge Detection method. **07**

Q.5 **(a)** Explain any one Lossy Compression technique in image processing. **07**

(b) Explain Opening and Closing of binary images with example of 5×5 binary image. **07**

OR

Q.5 **(a)** What is Representation and Description in image processing? Explain characteristics of good features. **07**

(b) Explain Discrete Cosine Transform and its application in image processing. **07**

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