Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII EXAMINATION – WINTER 2015

Subject Code:181102 **Date:12/12/2015**

Subject Name: Fundamentals of Image Processing

Time: 2:30pm to 5:00pm **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 Sampling and quantization in image and How does one avoid aliasing? **07**

(b) Explain Zooming with example and perform histogram stretching so that the new image has a dynamics range of [0, 7]. **07**

Grey level	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
No. of pixels	**0**	**0**	**50**	**60**	**50**	**20**	**10**	**0**

Q.2 **(a)** Explain Pseudo coloring. **07**

(b) Explain image formats and the concept of half toning. **07**

OR

(b) Explain and write MATLAB/SCILAB code for Contrast stretching and dynamic range compression of an image. **07**

Q.3 **(a)** Explain the inverse square law and what does the Weber imply? **07**

(b) Obtain the digital negative of the following 8 bits per pixel as given fig. (1) And Perform intensity level slicing on the BPP image. Let $\mathbf{r_1=3}$ and $\mathbf{r_2=5}$. Draw the modified image using with background and without background transformation as given fig. (2). **07**

121	205	217	156	151
139	127	157	117	125
252	117	236	138	142
227	182	178	197	242
201	106	119	251	240

Fig (1)

2	1	2	2	1
2	3	4	5	2
6	2	7	6	0
2	6	6	5	1
0	3	2	2	1

Fig (2)

OR

Q.3 **(a)** Explain Lossy compression and compare Lossless and Lossy compression. **07**

(b) Consider the 9 x6, 8- bit image. Perform LZW encoding. **07**

10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255

Q.4 **(a)** Explain Homomorphic filtering. **07**

(b) Explain and write MATLAB/SCILAB code for Butterworth high pass filter in frequency domain. **07**

OR

Q.4 **(a)** Explain Inverse Filtering and Wiener Filter **07**

(b) Explain Dilation and erosion of a pseudo image with MATLAB/SCILAB code. **07**

Q.5 **(a)** Explain HIT-MISS transformation with example. **07**

(b) Explain segmentation using second derivates-laplacian. **07**

OR

Q.5 **(a)** Explain Region filling. **07**

(b) Consider the same 8x8 image that we worked with in region growing. Let the predicate be threshold <= 3. Also draw the quad tree. **07**

5	6	6	6	7	7	6	6
6	7	6	7	5	5	4	7
6	6	4	4	3	2	5	6
5	4	5	4	2	3	4	6
0	3	2	3	3	2	4	7
0	0	0	0	2	2	5	6
1	1	0	1	0	3	4	4
1	0	1	0	2	3	5	4

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