

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019

Subject Code: 2170712

Date: 03/12/2019

Subject Name: Image Processing

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

MARKS

- Q.1** (a) Define the terms: Sampling, Quantization, Resolution **03**
 (b) Explain median filter with suitable data. **04**
 (c) Discuss the application of various types of waves in EM spectrum **07**
- Q.2** (a) Compare and contrast low pass vs. high pass spatial filtering **03**
 (b) Perform histogram equalization on following 4-bit image data: **04**
- | | | | | | | | | | | | | | | | | |
|------------------|---|---|---|----|---|---|----|---|----|---|----|----|----|----|----|----|
| Intensity Level | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Number of Pixels | 0 | 0 | 5 | 10 | 6 | 4 | 20 | 5 | 30 | 0 | 0 | 0 | 10 | 0 | 5 | 5 |
- (c) Write a short note on Gray level slicing and Bit plane slicing **07**
- OR**
- (c) Explain the working of adaptive median filter **07**
- Q.3** (a) Explain with applications: Log transformation, Power law transformation **03**
 (b) Explain average filter and also list its limitations. How to overcome the limitations of average filter. **04**
 (c) Differentiate: 1). Average vs. Median filter, 2). Gradient vs. Laplacian **07**
- OR**
- Q.3** (a) Write a short not on Butterworth low pass filter. **03**
 (b) Write a short note on: (A). Gaussian Noise, (B).Salt and Pepper Noise **04**
 (c) Discuss various high pass frequency domain filters. **07**
- Q.4** (a) Enlist various properties of Discrete Fourier Transform **03**
 (b) How gradient is useful to detect the discontinuity in image? **04**
 (c) Explain following procedure: Region spitting and region merging **07**
- OR**
- Q.4** (a) Discuss Euclidean, city block and chess board distance with suitable examples. **03**
 (b) Compare and contrast: Lossless and lossy compression **04**
 (c) Apply Huffman coding to determine the code for following data: the probability of symbols {A, B, C, D, E, F, G, H} is {0.22, 0.20, 0.18, 0.15, 0.10, 0.08, 0.05, 0.02.} **07**
- Q.5** (a) Discuss RLE compression algorithm. **03**
 (b) Differentiate: Image enhancement vs. Image Restoration **04**
 (c) Write a note on Geometric mean and contra harmonic mean filters. **07**
- OR**
- Q.5** (a) Discuss temporal redundancy in image. **03**
 (b) Write a short note on pseudo color image processing **04**
 (c) Explain: RGB and HIS color models **07**
