Code No:127CJ **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech IV Year I Semester Examinations, May/June - 2019
DIGITAL IMAGE PROCESSING
(Electronics and Communication Engineering)

Time: 3 Hours **Max.Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) How to represent the image? [2]
b) What is 4-, 8-, m- connectivity? [3]
c) What is High boost High pass filter? [2]
d) Compare linear and nonlinear gray level transformations. [3]
e) What are the advantages of Restoration? [2]
f) What are the different sources of degradation? [3]
g) What is erosion? [2]
h) How discontinuity property is used in image segmentation? [3]
i) What is mean by redundancy? [2]
j) What is fidelity? How it is used in image processing? [3]

PART-B

(50 Marks)

2.a) How to sample the image and how it differ from signal sampling?
b) Explore the relationship between pixels. [4+6]

OR

3.a) Define 2-D DFT and prove its convolution property and also write its applications.
b) Derive the 8 × 8 Slant transform matrix and write its order of sequence. [5+5]

4.a) Explain local enhancement techniques and compare it with global enhancement techniques.
b) Explain Histogram equalization method with example. [5+5]

OR

5.a) Consider the following image segment x and enhance it using the equation $y = k\,x$ where k is constant and y is output image.

0	1	2	3	4	5	6	7
54	35	64	53	123	43	56	45

b) Explain how low pass filter is used to enhance the image in frequency domain? [5+5]

6.a) Explain how image restoration improves the quality of image.
b) What is inverse filter? How it is used for image restoration? [5+5]

OR

7.a) How wiener filter is used for image restoration? What are the limitations of it?
b) What are the applications of restoration? [6+4]

8.a) How edge linking process is used to segment the image?
b) How to choose the threshold value while segmenting the image? [5+5]

OR

9.a) What are necessary condition to apply region based segmentation?
b) What is mean by Hit and Miss morphological operation? Write some example. [5+5]

10. Suppose the alphabet is *[A, B,C]*, and the known probability distribution is P_A= *0.5*, P_B= 0.4, P_c= 0.1. For simplicity, let's also assume that bothencoder and decoder know that the length of the messages is always 3, so thereis no need for a terminator.
a) How many bits are needed to encode the message BBB by Huffmancoding?
b) How many bits are needed to encode the message BBB by arithmetic coding?
c) Analyze and compare the results of (a) and (b). [10]

OR

11.a) Draw the general block diagram of compression modal and explain the significance of each block.
b) Explain the loss-less prediction code for image compression with neat diagrams and equations. [5+5]

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