BE / ETRX / VII / (BGS / DDP / 06/06/16

Sub:- Elective - I :- Digital Image Processing

QP Code : 31535

(3 Hours) **[Total Marks : 80**

N.B. (1) Question No. 1 is compulsory.
(2) Attempt any three questions from remaining.
(3) All questions carry equal marks.
(3) Assume suitable data wherever necessary.

Q.1 Answer any Four of the following:
a) Explain the components of Image processing system. (5)
b) List properties of 2D DFT. (5)
c) Explain Erosion and Dilation in brief. (5)
d) Justify. "Huffman coding is a lossless compression technique". (5)
e) Why is the sum of coefficients of a high pass filter mask zero? (5)

Q.2 a) Define Image Enhancement. Explain the following enhancement operations and draw the graphs of transformation function: (10)
1. Bit plane slicing 2. Gray level slicing

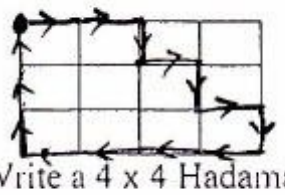
b) An 8 level image is given below. Perform Histogram equalization and draw histograms of original and equalized images. (10)

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

Q.3 a) Perform edge detection using graph theoretic technique for the image segment shown below. Assume that edge starts from first row and ends by third row. Find the edge corresponding to minimum cost path. (10)

7	5	2
0	2	4
2	4	3

b) What are chain codes? Obtain the four directional and eight directional chain codes for the boundary shown below: (10)



Q.4 a) What is Hadamard Transform ? Write a 4 x 4 Hadamard matrix and ita applications. Is H(4) ortogonal and normalized. (10)

b) Explain the following morphological operations:- (10)
i) Hit and Miss Transformations
ii) Opening and Closing

Q.5 a) Generate the Huffman code for the sentence: "COMMITTEE" (10)
Calculate entropy of the source, average length of the code generated and coding efficiency.

b) What are the different types of data redundancies present in a digital image? Explain them. (10)

Q.6 Write short notes on any **three** of the following:- (20)
a) JPEG
b) DWT
c) Image sampling and Quantization
d) Isopreference Curves

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