VII Dse: IP comp (CBGS)

3115116

QP Code : **31386**

(3 hours) [80 Marks]

N.B.:
1. Question No.1 is **compulsory**.
2. Attempt any **Three** questions out of remaining **Five** questions.
3. Figures to the right indicate full marks.
4. Assume any suitable data wherever required but justify the same.

Q.1

a) What is Unitary transform matrix? Explain with example. 5

b) Explain in short sampling and quantization method for digital image. 5

c) Explain in short morphological operations Dilation and Erosion. 5

d) Justify /contradict: All Image compression techniques are invertible. 5

Q.2 a) Explain in detail any two types of Image File Formats. 8

b) For the 3 bit 4x4 size image perform following operations. 12

i) Thresholding T = 3

ii) Intensity level slicing with background, $r_1 = 3$ and $r_2 = 5$

iii) Bit plane slicing for MSB and LSB planes

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

Q.3 a) Perform histogram equalization and draw new equalized histogram of the following image data 10

Gray Level	0	1	2	3	4	5	6	7
No. of pixels	400	700	1350	2400	3000	1500	650	0

b) Find Huffman code for the symbols given below. Which kind of redundancy is removed by Huffman code? Explain the term Compression Ratio. 10

Symbols	Probability
a_1	0.1
a_2	0.3
a_3	0.2
a_4	0.25
a_5	0.07
a_6	0.08

[TURNOVER

Q.4 a) Using matrix multiplication method calculate 2-D DFT of 10

$$f(x, y) = \begin{bmatrix} 1 & 0 & 3 & 1 \\ 1 & 1 & 2 & 2 \\ 2 & 0 & 1 & 3 \\ 1 & 2 & 2 & 4 \end{bmatrix}$$

b) Using the Butterfly diagram, compute Hadamard transform for 10
x(n) = { 1, 2, 3, 4, 1, 2, 1, 2}

Q.5 a) What are the different types of redundancies in digital image? Explain 10
in detail giving example of each.

b) What is image segmentation? Explain the following methods of image 10
segmentation.
i) Region growing
ii) Split and Merge

Q.6 Write detail notes on (any two) 20
i) Hough Transform
ii) Homomorphic filter
iii) Hit or Miss Transform
iv) Chain code