## Sub' - Digital Image Processing

6/16

BM/10/CBGS/DIP QP Code: 5105.

(3 Hours)

[Total Marks: 80

N. B.: (1) Question No. 1 is compulsory.

- (2) Attempt any three questions out of remaining five questions.
- (3) Assume suitable data.
- (4) Assumption should be clearly stated.
- (5) Use legible handwriting. Use black ballpoint pen.
- 1. Justify the following statement:

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- (a) Every Orthogonal matrix is Unitary matrix
- (b) Zooming by interpolation is better technique than zooming by replication
- (c) Prewitt and sobel operator perform well on noisy image than Roberts operator
- (d) Butterworth filter is preferred over Ideal filter
- (e) Number of computation in FFT are less as compared to DFT
- 2. (a) Explain the arithmetic coding with suitable example.
  - (b) Find the Huffman code for the following stream data

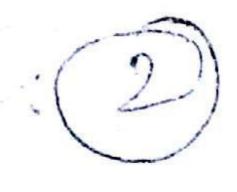
    {a,a,a,a,a,a,a,b,b,b,c,c,c,c,c,d,d,d,d,d,d,d,d,d,d,e,e,e,e,f,f}
- 3. (a) For given Image find moments

	1	2	3	4	Y
1 .	3	1	2	2	
2	2	3	. 2	1	
3	3	2	0	1	
4	1	0	3	2	10 N
X				2	

M(0,0), m(1,0), m(0,1), m(1,1), m(2,0)

- (b) Describe in detail how Hough transform is used for boundary shape detection
- 4. (a) Explain the Homomorphic filtering and its application 10
  - (b) Explain steps involved in filtering in frequency domain. Also explain the gaussion filter.

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BIN/VIICBGS/D

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Derive the 8x8 matrix for walsh transform. Also show the walsh basis function for N=4

Plot the histogram for the following image. Perform histogram equalization and then plot the equalized histogram and histogram equalized image.

1	1	3	6	4	3	1
5	6	3	4	5	5	3
3	4	3	2	4	3	5
5	5	4	1	3	2	3
1.	3	4	. 5	6	5	4
4	6	. 4	1	2	2	3
2	4	6	3	2	4	5

- Discuss the following image enhancement technique and give their 10 application
  - (i) Log Transformation
  - (ii) zooming

(b) Explain the Sine transform

JP-Con. 12464-15.