Amit Kr Singh

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -1 EXAMINATION- September 2016
B. Tech (CSE) VII Semester

COURSE CODE: 10B1WCI737 MAX. MARKS: 15
COURSE NAME: Image Processing Techniques
COURSE CREDITS: 03 MAX. TIME: 1Hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Ques 1 [1.5+2.5=4 Marks] Discuss the advantages of arithmetic encoding technique over the Huffman code? Consider the following alphabet {e, m, n, o, t} with probabilities as follows: p (e) = 0.6; p (m) = 0.2, p (n) = 0.1, p (o) = 0.05, p (t) = 0.05. Encode the word "**emo**" with arithmetic encoding.

Ques 2 [1+3=4 Marks] Discuss is the goal of image transform? Find singular value decomposition (SVD) of the image segment

$$\text{IMAGE 1} = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 3 & 1 \end{bmatrix}$$

Ques 3 [2+2=4 Marks] Discuss the algorithmic steps of Haar basis for N=4. Also, calculate the Haar transform of the image

$$\text{IMAGE 2} = \begin{pmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{pmatrix}$$

Ques 4 [1+2=3 Marks] State the rotation properties of discrete Fourier transform (DFT)? Also, compute the DFT of an multimedia data in form of image is shifted so that its top left coordinate, instead of being at position (0,0), is at position (-3/2, -3/2).

$$\text{IMAGE 3} = \begin{pmatrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$