


Name:			
Enrolment No:			
UPES End Semester Examination, May 2023			
Course: Digital Image and Video Processing Program: B. Tech ECE Course Code: ECEG4034 P		Semester: VIII Time : 03 hrs. Max. Marks: 100	
Instructions: Answer must be brief and to the point.			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Comment on the different types of image segmentation techniques.	4M	CO1
Q 2	Discuss the properties of 2D Fourier Transform.	4M	CO2
Q 3	Define Discrete Cosine Transform. How do you interpret the frequency in an image?	4M	CO1
Q 4	Define sampling theorem and specify it for 2D images suitable example.	4M	CO2
Q 5	Define the following terms: i) image restoration, ii) Compression, iii) Segmentation, iv) morphological processing.	4M	CO1
SECTION B (4Qx10M= 40 Marks)			
Q 6	What are the steps involved in Digital Image Processing? Explain its various step, in detail, by drawing a block diagram.	10M	CO1
Q 7	Derive the Walsh transform function in 1D and 2D and list down all its properties.	10M	CO4
Q 8	(a) Derive the method of block matching algorithm. (b) Derive, with a suitable example, the procedure of Huffman's coding.	5M +5M	CO4
Q 9	Explain the implementation of image enhancement in the Frequency Domain. How the cutoff frequency, in an ideal LPF, has been chosen? OR Explain the process of the working of smoothing and sharpening frequency domain filters?	10M	CO2

SECTION-C
(2Qx20M=40 Marks)

Q 10	Attempt any two (out of these three questions): (a) What are the different types of edge linking and boundary detection methods in video processing? (b) Write a short note on the following video processing methods: i. Mesh-based motion estimation. ii. Global Motion estimation. (c) Explain region-based motion estimation and multi-resolution motion estimation with applications in video coding.	20M	CO2
Q 11	(a) Evaluate the 2-D Z-transform of the following two: i. $x(n_1, n_2) = a^{n_1} b^{n_2} u(n_1, n_2)$. ii. $x(n_1, n_2) = a^{n_1} \delta(n_1 - n_2) u(n_1, n_2)$. (b) What are the different types of gray-level transformations? Explain piece-wise linear transformation.	20M	CO3