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VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech VII Semester Supplementary Examinations, May - 2022

(Regulations: VCE-R15)

DIGITAL IMAGE PROCESSING

(Electronics and Communication Engineering)

Date: 28 May, 2022 AN

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

Unit – I

1. a) With the block diagram explain components/elements of image processing system. 8M
 b) Discuss how is sampling been done when an image is generated by a single sensing element using sensing strip. 7M
2. a) Recall the advantages of following image processing stems: 8M
 i. Image enhancement
 ii. Image segmentation
 iii. Image compression
 iv. Image representation
 b) Explain in detail the effect of varying the following with suitable example: 7M
 i. Number of gray levels used
 ii. Number of pixels in the given image

Unit – II

3. a) Develop the proofs for the following 2-D DFT properties : 7M
 i. Translation
 ii. Periodicity
 iii. Average value
 b) Derive the 1-D walsh transform kernels table for N=4. 8M
4. a) Define 2-D DCT. Find 2-D DCT matrix for N=4. 8M
 b) Describe the procedure for Hotelling transform. 7M

Unit – III

5. a) Explain any two spatial filters. 8M
 b) Explain histogram equalization. 7M
6. a) Discuss two smoothing techniques in spatial domain. 8M
 b) Explain image smoothing in frequency domain using ideal lowpass filter. 7M

Unit – IV

7. a) Explain the HSI color model. 8M
 b) Explain any three order static filters. 7M
8. a) Explain minimum mean square error filtering and its importance. 8M
 b) Explain Huffman coding in detail and its application in lossy compression of image. 7M

Unit – V

9. a) Draw the block diagram for converting gray level intensity to color transformation and explain it. 8M
 b) Obtain Huffman code for the following source symbol: 7M
 (a1 a1 a1 a1 a2 a2 a2 a3 a3 a3)
10. a) Explain region splitting and merging approach in region based segmentation. 6M
 b) Explain the types of redundancy present in image. 9M