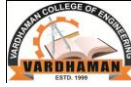


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VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

An Autonomous institute affiliated to JNTUH

B. Tech VII Semester Supplementary Examinations, December - 2021

(Regulations: VCE-R14)

DIGITAL IMAGE PROCESSING

(Electronics and Communication Engineering)

Date: 23 December, 2021 FN

Time: 3 hours

Max Marks: 75

Answer ONE question from each Unit

All Questions Carry Equal Marks

Unit – I

1. a) Illustrate the block diagram and explain each block of the fundamental steps used in digital image processing. **9M**
 b) Explain simple image model. **6M**
2. a) Discuss the role of sampling and quantization with an example. **7M**
 b) Consider the image segment. Let $V = \{0, 1\}$ and compute the lengths of shortest 4, 8 and m-path between p and q. if a particular path does not exist between p and q, explain why? **8M**

3	1	2	$l(q)$
2	2	0	2
1	2	1	1
$(p)l$	0	1	2

Unit – II

3. a) Derive the 1-D walsh transform kernels table for N=4. **8M**
 b) Give the formulation for determining DCT of an Image. List the properties. **7M**
4. a) Find the 2D IDFT of $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ **6M**
 b) From Hadamard transform matrix for N=2 obtain Hadamard Matrix for N=4 and N=8. Comment on the sequency. **9M**

Unit – III

5. a) What is meant by histogram? Explain histogram equalization with necessary derivations. **7M**
 b) Discuss with relevant equations image smoothing in frequency domain by ideal low pass filter and Gaussian filter. **8M**
6. a) Explain the following gray level transformations: **8M**
 i. Log transformations
 ii. Power-law transformations
 iii. Contrast stretching
 b) Explain arithmetic and logical operations used image enhancement. **7M**

Unit – IV

7. a) Discuss Wiener filtering. **8M**
 b) Explain full-color image processing. **7M**
8. a) Explain mean square error filtering. **8M**
 b) Explain Pseudo-color image processing. **7M**

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Unit – V

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|-----|----|-------------------------------------------------------------------------------------------|-----------|
| 9. | a) | Explain the following compression fundamentals: | 8M |
| | | i. Coding redundancy | |
| | | ii. Spatial and temporal redundancy | |
| | | iii. Irrelevant Information | |
| | b) | Explain Lossless predictive coding with block diagram. | 7M |
| 10. | a) | What is an edge? Explain how gradient and Laplacian operators are used in edge detection. | 7M |
| | b) | Explain region splitting and merging approach in region based segmentation. | 8M |