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18CS741

Seventh Semester B.E. Degree Examination, June/July 2024

## Digital Image Processing

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain the components of a general purpose image processing system with diagram. (10 Marks)
- b. Explain the concept of sampling and quantization with diagrams. (10 Marks)

OR

- 2 a. Explain the fundamental steps in digital image processing. (10 Marks)
- b. Define 4-adjacency, 8-adjacency and m-adjacency. (06 Marks)
- c. If P and Q are two pixels at coordinates (100, 120) and (130, 160) respectively. Find chess board and cityblock distance. (04 Marks)

### Module-2

- 3 a. Explain Price – Wise – Linear – Transformation functions. (10 Marks)
- b. What are the applications of arithmetic and logical operations? (10 Marks)

OR

- 4 a. Discuss smoothing linear filters and order statistics filter. (10 Marks)
- b. Describe how first order derivatives are used for image enhancement. (10 Marks)

### Module-3

- 5 a. Discuss one dimensional Discrete Fourier Transform and its inverse. (10 Marks)
- b. Explain translation and separability properties of DFT. (10 Marks)

OR

- 6 a. What are the basic steps for filtering in frequency domain? Explain with a neat diagram. (08 Marks)
- b. Explain the following frequency domain filter  
Ideal Lowpass filter, Butterworth low pass filter, Gaussian lowpass filter. (12 Marks)

### Module-4

- 7 a. What are the three basic types of gray level discontinuities? Explain point detection. (10 Marks)
- b. Describe region splitting and merging with example. (10 Marks)

OR

- 8 a. Define image segmentation and explain line detection. (10 Marks)
- b. Explain basic global thresholding. (10 Marks)

### Module-5

- 9 a. What are the principles types of data redundancies? Discuss. (10 Marks)
- b. Explain the general image compression system with necessary diagram. (10 Marks)

OR

- 10 a. Write short note on : i) Huffman coding ii) LZW coding. (10 Marks)
- b. What is image compression? Where is it used? List the differences between lossy and lossless compression. (10 Marks)

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