

(Time: 2<sup>1/2</sup> Hours)

[Total Marks: 75]

- N. B.: (1) All questions are compulsory.  
 (2) Make suitable assumptions wherever necessary and state the assumptions made.  
 (3) Answers to the same question must be written together.  
 (4) Numbers to the right indicate marks.  
 (5) Draw neat labeled diagrams wherever necessary.  
 (6) Use of Non-programmable calculators is allowed.

1. **Attempt any three of the following:** 15
  - a. Explain Digital Image Processing and state its various applications
  - b. Explain the use of fuzzy techniques in image processing.
  - c. Explain histogram equalization
  - d. Explain pixel and its relationships with its neighbourhood pixels
  - e. What is filtering? What do you understand by the term spatial filtering?
2. **Attempt any three of the following:** 15
  - a. Explain the filters which are used for noise reduction of an image.
  - b. What are the basic steps of filtering in the frequency domain?
  - c. Explain the 2D- Fourier transform function with an example
  - d. Explain sharpening in the frequency domain.
  - e. Write a short note on Wiener Filtering
3. **Attempt any three of the following:** 15
  - a. Explain with an example explain Huffman coding.
  - b. Explain the LZW Coding with an example.
  - c. Explain the Pseudocolor Image Processing
  - d. Explain the Symbol-based Coding with an example
  - e. Explain the basic functions in the Time-Frequency Plane
4. **Attempt any three of the following:** 15
  - a. Explain the image segmentation using Graph cuts in detail
  - b. Describe Morphological image processing in brief
  - c. What is thresholding? Explain about global thresholding
  - d. Explain the Geodesic Dilation and Erosion
  - e. Explain Erosion and Dilation of an image with an example.
5. **Attempt any three of the following:** 15
  - a. With a neat sketch explain Topological Descriptors in detail
  - b. What are chain codes? Explain with examples
  - c. Explain image segmentation using active contours
  - d. Define Image Segmentation? Explain Image segmentation using snakes
  - e. Explain Harris-Stephens Corner detector algorithm.

\*\*\*\*\*