

Time:(2 Hours)

[Total Marks: 60]

- 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.

Q1. Attempt the two of the following.

12 Marks

- Explain pixel and its relationship with neighboring pixels.
- What are the key components of an image processing system?
- Describe the bit-plane slicing transformation process and its applications.
- Write a short note on smoothing filters in the spatial domain.

Q2. Attempt the two of the following.

12 marks

- How does filtering work in the frequency domain? Provide a detailed explanation.
- Explain the process of image sharpening in the frequency domain.
- Discuss the various spatial or frequency-based filters used for image reconstruction.
- Describe the model of image degradation and reconstruction, including a diagram.

Q3. Attempt the two of the following.

12 marks

- Write a short note on the slant transform.
- Explain the different color models used in image processing.
- Describe Huffman coding with an illustrative example.
- Provide a brief note on digital image watermarking.

Q4. Attempt the two of the following.

12marks

- Write a short note on erosion and dilation in morphological operations.
- Explain the hit-or-miss transformation in image processing.
- Discuss region-based segmentation techniques.
- Explain edge detection methods used in image segmentation.

Q5. Attempt the two of the following.

12 marks

- What are level sets in image segmentation? Provide a detailed explanation.
- What are the limitations of classical methods in image segmentation?
- Describe region descriptors used in image segmentation.
- Explain the Harris-Stephens corner detector algorithm.
