

Duration: 3 hrs**[Max Marks: 80]**

- N.B. : (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

1 Attempt any FOUR

A Explain image fidelity criteria. [5]

B Write a short note on image sampling and quantization. [5]

C Give the names of all point processing techniques and explain any one in detail. [5]

D Justify/Contradict the statement "The first difference of the chain code makes it invariant to rotation". [5]

E Give the difference between skeletonization and thinning. [5]

2 A Equalize the given histogram. Also draw an equalized histogram. [10]

| | | | | | | | | |
|--------------|-----|----|----|----|---|---|---|---|
| Grey level | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| No.of pixels | 100 | 80 | 10 | 10 | 0 | 0 | 0 | 0 |

B Explain region based image segmentation. [10]

3 A Compare filtering in spatial domain with filtering in frequency domain. [10]

B Describe erosion and dilation in morphology. [10]

4 A Use Huffman coding technique for eliminating coding redundancy in this image. Find the Huffman code for each gray level. Also find the compression ratio. [10]

| | | | |
|---|---|---|---|
| 1 | 1 | 1 | 1 |
| 3 | 1 | 6 | 6 |
| 2 | 1 | 7 | 4 |
| 7 | 7 | 5 | 0 |

B Calculate HAAR transform for the sequence $x(n) = \{10, 8, 4, 6\}$. Also calculate energy in each component. [10]5 A Calculate D_4 , D_8 , D_m distance between P (Left bottom pixel) and Q (right top pixel) for $v = \{0, 1\}$. [10]

| | | | |
|-----|---|---|-----|
| 3 | 1 | 2 | 1 Q |
| 2 | 2 | 0 | 2 |
| 1 | 2 | 1 | 1 |
| 1 P | 0 | 1 | 2 |

B Explain Discrete Fourier transform. List DFT properties and give its applications in image processing. [10]

6 A Write a short note on Hough transform. [10]

B What are the different types of data redundancies present in digital Image? Explain each type in detail. [10]
