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.

Q.(1) Explain the following: [20]
        (i)   Dynamic Range Compression
        (ii) Edge Detection Operators
        (iii) Vector Quantization
        (iv) Erosion and Dilation

Q.2 (a) For given 5x5 image compute the De, D4, D8 and Dm distances between pixels p and q.   [10]
Let V be the set of gray levels to define the similarity criteria, where V = {2, 3}.

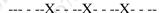| 1	2	1	2	3 (q)
3	1	0	3	1
2	3	2	0	2
0	3	2	2	3
2 (p)	1	3	2	3

    (b) What are point-processing techniques for enhancement? Explain Contrast Stretching in detail. [10]

Q. 3 (a) Explain filtering in the spatial domain.   [10]

    (b) Equalize the given histogram and plot the new equalized histogram. Show necessary Steps.   [10]

Gray Level	0	1	2	3	4	5	6	7
No. of Pixels	70	100	40	80	60	40	08	02

Q.4 (a) Explain Homomorphic filtering with the help of a block diagram.   [10]
    (b) Compute the Hadamard transform of the given image: [10]

1	2	3	4
1	2	1	2
4	3	2	1
2	1	2	1

Q.5 (a) Consider an 8-pixel line of gray scale data: [12, 12, 13, 13, 10, 13, 57, 54] which has been   [10]
    uniformly quantized with 6-bit accuracy. Construct its 3-bit IGS code. Compute the RMS
    error and rms signal to noise ratio for the decoded IGS code.

    (b) Explain Lossless predictive coding with the help of suitable encoder and decoder models.   [10]

Q.6 Write short notes on **ANY TWO** of the following: [20]
    (a) Chain codes and Shape Number
    (b) Hit - or - Miss Transform
    (c) Graph Theoretic Technique

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