Time: 3 Hours   Marks: 80

N .B. (1) Q.1 is compulsory

   (2) Solve any three questions from remaining 6 questions

   (3) Assume suitable data if it is required.

Q.1 (a) Justify or contradict the following statements.(**Any two**)   [10]

   (i) DCT is efficient transform for highly correlated data.
   (ii) Mixed adjusancy is uesd to avoid amiguity that often arrises when
     8 adjaceny is uesd.
   (iii) Continuous image histogram can be perfectly equalized but it may not
     be so for digital image.

 (b) Perform opening and closing operation on the following image(A) using the structuring
   element (B)

1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
0	0	0	0	1

A=

1	1	1

B=   [05]

(c) Find Covariance Matrix for the image A: [05]

$$A= \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$$

Q.2 (a) Write applications\advantages\effects of following techniques: [10]
     (i) Hit or Miss transform (ii) Power Low transformation (iii) LoG(Laplacian of
   Guassian) Operator (iv)Image Restoration (v) Hiigh Boost filtering

(b) Explain different types of video frames.   [05]

(c) Compare:Contrast straching and Histogram Equalizaltion   [05]

Q.3 (a) State and prove translation property of DFT. Find DFT of the following image .

[10]

0	1	2	3
3	2	1	2
1	2	1	1
2	3	1	1

 (b) What is motion vector? Explain optical flow equation.   [10]

76837

E4166FBCBC26C4F0D54936B96ADF9A17

Q.4 (a) Compare:Image enhancement and image restoration [04]

(b)Write different line detection masks in an image. Detect 45∘ inclined line in the following image :Z

[10]

Z =

| 10	10	100
10	100	10
100	10	10

(b) Explain pixel-based motion estimation technique. [06]

Q.5 (a) What are the important features of wiener filter. Derive transfer function of

wiener filter [10]

(b)Perform following operations on the image X :

X =

10	6	7	3
4	6	13	5
9	0	7	6

(i) Negative [02]

(ii) Bit plane slicing [03]

(iii) Histogram plot [03]

(iv) Compute the number of bits required to store the image [02]

Q.6(a) List the different properties of region which are used for region based image segmentation. Segment the following image (S) using region split and merge technique. Draw the corresponding quad tree. [10]

S=
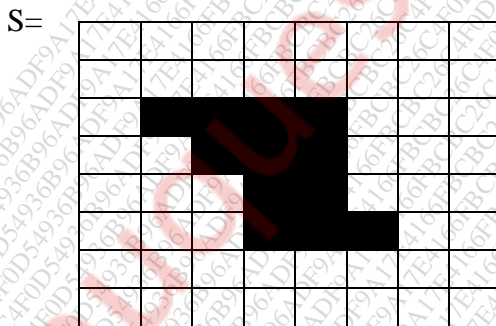
(b) Explain in brief Homomorphic filtering. [05]

(c) Explain HSI color model. [05]

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