

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 adjacency is used to avoid ambiguity that often arises when 8 adjacency is used.
 - (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)

A=

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

B=

1	1	1
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(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 Gaussian) Operator (iv)Image Restoration (v) High Boost filtering

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

(c) Compare: Contrast straching and Histogram Equalization [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]

- 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]

$$Z = \begin{bmatrix} 10 & 10 & 100 \\ 10 & 100 & 10 \\ 100 & 10 & 10 \end{bmatrix}$$

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

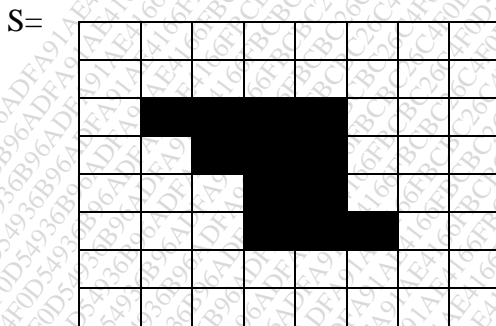
- Q.5 (a) What are the important features of wiener filter. Derive transfer function of wiener filter [10]

- (b)Perform following operations on the image X :

$$X = \begin{bmatrix} 10 & 6 & 7 & 3 \\ 4 & 6 & 13 & 5 \\ 9 & 0 & 7 & 6 \end{bmatrix}$$

- (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]



- (b) Explain in brief Homomorphic filtering. [05]
 (c) Explain HSI color model. [05]
