**QP Code : 31598**

### (3 Hours)      [Total Marks : 80]

**N.B.:**   Q1 is compulsory.

Write any three questions out of remaining.

Assume suitable data wherever necessary.

| | | | |
|---|---|---|---|
| Q1 | (a) | Show that High pass = original – low pass | 05 |
| | (b) | How contrast stretching is different than thresholding | 05 |
| | (c) | Explain Digital water marking and its application | 05 |
| | (d) | Explain Discrete time system | 05 |
| Q2 | (a) | Find DFT of the image | 10 |

| 0 | 1 | 2 | 1 |
|---|---|---|---|
| 1 | 2 | 3 | 2 |
| 2 | 3 | 4 | 3 |
| 1 | 2 | 3 | 2 |

| | | | |
|---|---|---|---|
| | (b) | Explain HIT and Miss Transform | 10 |
| Q3 | (a) | Calculate the direction of the edge at the centre point of the image | 10 |

$$I = \begin{bmatrix} 50 & 60 & 70 \\ 5 & 50 & 80 \\ 7 & 9 & 50 \end{bmatrix}$$

| | | | |
|---|---|---|---|
| | (b) | Explain various frequency domain low pass filters in detail | 10 |
| Q4 | (a) | Perform histogram stretching so that new image has a dynamic range of [0, 7] | |

| Grey level | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| No. of Pixels | 100 | 90 | 85 | 70 | 0 | 0 | 0 | 0 |

| | | | |
|---|---|---|---|
| | (b) | Differentiate between point operation and neighbourhood operations | 10 |
| Q5 | (a) | Compare lossless and lossy compression techniques | 10 |
| | (b) | Explain application of image processing in digital watermarking | 10 |
| Q6 | (a) | For the given 3 bit , 4x4 size image perform the following operations | 10 |
| | |   (i)    thresholding | |
| | |   (ii)    bit plane slicing for LSB and MSB planes | |
| | (b) | Explain walsh and wavelet transform | 10 |

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**FW-Con.12192-16.**