

- N.B.** (1) Question No. 1 is compulsory.
 (2) Solve any four questions out of remaining six questions.
 (3) Figures to the right indicate full marks.
 (4) Assume suitable data if necessary.

1. Solve any four questions :—
- (a) Show that :- Highpass=original-lowpass. 5
- (b) Justify lossy compression is not suitable for compressing executable files. 5
- (c) For 8-point DFT the first five DFT coefficients are – 5
 $x(k) = x\{10, 2+3j, 1+2j, j, 4\}$
 Find the remaining coefficients.
- (d) What is wavelet ? Explain wavelet transform in brief. 5
- (e) Compare and contrast between contrast stretching and thresholding. 5
2. (a) Perform the following operations on given signal :— 10
 $x(n) = \{1, 2, 3, 5\}$
 (i) $x(-n-1)$
 (ii) $x(n-2)$
 (iii) $x(n+1)$
 (iv) $x(-n+2)$
 (v) $2x(n)$
- (b) State and prove any four properties of DFT. 10
3. (a) Perform histogram stretching so that the new image has a dynamic range of [0, 7]. 10
- | | | | | | | | | | |
|---------------|---|-----|----|----|----|---|---|---|---|
| Gray level | : | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| No. of pixels | : | 100 | 90 | 85 | 70 | 0 | 0 | 0 | 0 |
- (b) Explain segmentation based on thresholding in detail. 10
4. (a) Explain various frequency domain low pass filters in detail. 10
- (b) Obtain linear convolution of 2 signals given as – 10
 $x(n) = u(n)$
 $h(n) = a^n u(n), a < 1.$
5. (a) Give in detail classification of signals. 10
- (b) For the given 3 bit, 4×4 size image perform the following operations – 10
- (i) thresholding, ($T = 4$)
- (ii) intensity level slicing with background for $r_1 = 2, r_2 = 5$
- (iii) Bit plane slicing for LSB and MSB planes
- (iv) Negation.
- | | | | |
|---|---|---|---|
| 4 | 2 | 3 | 0 |
| 1 | 3 | 5 | 7 |
| 5 | 3 | 2 | 1 |
| 2 | 4 | 6 | 7 |
6. (a) What is Morphology ? Name and explain basic operations in morphology. 10
- (b) Find the Arithmetic codeword of message India. Calculate the percentage of 10
 compression and bit/pixel of the compression message.
7. Write short notes on (any four) :— 20
- (a) Lossy Vs Lossless compression techniques
- (b) Walsh transform
- (c) Discrete time systems
- (d) Sampling and Quantization
- (e) Digital watermarking.