Time: 3 Hrs **Marks: 80**

N.B.

1) Question No. 1 is compulsory
2) Solve any three questions out of the remaining five questions.
3) Assume suitable wherever necessary, justify the same

1 a) Describe the basic elements of Image Processing System. **(5)**

b) Describe image sampling and quantization with the help of an example. **(5)**

c) For below given image, perform digital negative and thresholding with T=4. Given: 3-bit 4*4 size image **(5)**

1	2	3	0
2	4	6	7
5	2	4	3
3	2	6	1

(5)

d) Show that High Pass = Original – Low Pass

2 a) Calculate the direction of the edge at the center point of the image: **(10)**

I =

50	60	70
5	50	80
7	9	50

b) Explain region based segmentation. Describe the different ways in which region based segmentation can be carried out. **(10)**

3 a) Perform Histogram Equalization. **(10)**

Grey Level	0	1	2	3	4	5	6	7
No. of Pixels	123	78	281	417	639	1054	816	688

(10)

b) Explain Ideal Low Pass Frequency domain filter in detail.

4 a) Define global thresholding? Write an algorithm to calculate global threshold. **(10)**

b) Calculate the coding efficiency of Huffman Code for the following symbols: **(10)**

Symbol	**Probability**
A1	0.9
A2	0.06
A3	0.02
A4	0.02

5 a) Explain global processing using Hough transform. **(10)**
b) What is biometric authentication? State requirements of image processing in biometric? **(10)**

6 Write Short note: **(Any 4)** **(20)**
a) HIT or MISS Transformations
b) Smoothing and Sharpening filters in spatial domain
c) Edge Detection Masks/Filters
d) Image Compression Model
e) Properties of DFT

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