

Digital Image Processing

05/06/18

[Total Marks: 80]

(3 Hours)

- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any three questions from remaining.
 (3) All questions carry equal marks.
 (4) Assume suitable data wherever necessary.

Q.1 Answer any four of the following:

- a) Justify Huffman coding is a lossless compression technique. (5)
 b) Explain the role of illumination in segmentation. (5)
 c) Explain Bit-plane slicing with the help of an example. (5)
 d) Discuss various color models used in image processing. (5)
 e) Explain any two properties of 2D DFT. (5)

Q.2 a) Perform Histogram Equalization on Gray level distribution shown in the table. Draw the histograms of the original and equalized images. Comment on the contrast of the image before histogram equalization and after histogram equalization. (10)

Gray Levels	0	1	2	3	4	5	6	7
No. of Pixels	0	100	400	50	200	50	200	0

Q.2 b) Explain Homomorphic filtering with the help of a neat block diagram. (10)

Q.3 a) Using Hough transform find the equation of the line that passes through maximum number of points using the following edge points. (10)

(1, 4), (2, 3), (3, 1), (4, 1) and (5, 0)

Q.3 b) Calculate the efficiency of Huffman code for the following symbol whose probability of occurrence is given below: (10)

Symbol	a1	a2	a3	a4
Probability	0.9	0.06	0.02	0.02

Explain Run-length coding with the help of an example.

Q.4 a) Consider an 8x8 image, the grey level ranges from 0 to 7. Segment this image using region growing and region splitting technique. Comment on the results. (10)

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

Q.4 b) Explain the following morphological operations with the help of an example. (10)

- i) Opening
- ii) Closing

Q.5 a) Explain discrete wavelet transform in detail. Discuss its relevance in compression. (10)

Q.5 b) Explain any two spatial filtering techniques for image enhancement with the help of examples. (10)

Q.6 Write short notes on any four of the following: (20)

- a). Distance Transforms
- b). Chain Codes
- c). Data redundancies
- d). Eye Diagram
- e). Low pass averaging filter
