

1108

B. Engg. (Computer Science and Engineering)
7th Semester

CS-701: Digital Image Processing

Time allowed: 3 Hours

Max. Marks: 50

Note: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

- Q1. a) What is log transformation? How it is useful in image processing? 10
b) Differentiate between coding, psycovisual and inter-pixel redundancy.
c) Define image degradation. Explain the various causes of degradation in an image.
d) Give any two applications of image segmentation techniques.
e) Differentiate between Fourier transform and wavelet transform.

Section-A

- Q2. a) Define digital image processing. What are the various fundamental steps involved in digital image processing? 5
b) Explain how analog image is converted into digital image with the help of suitable diagram. 5
- Q3. a) Explain briefly the transformation function used for image which appears to be dark due to wrong lens aperture setting. 3
b) What is Fourier transform? Write expression of discrete Fourier transform of an image. 4
c) Explain image restoration technique using inverse filtering. 3
- Q4. a) How can you convert a color specified in RGB model to HIS model? 4
b) Perform histogram equalization of image for following intensity distribution. 6

Gray Level	0	1	2	3	4	5	6	7
Number of Pixels	790	1023	850	656	329	245	122	81

Section-B

- Q5. a) Define thresholding. Describe various thresholding methods for image segmentation. Discuss the method to obtain optimal threshold. 6
b) The region growing algorithm starts with a seed pixel. The selection of the seed pixel depends on application. You are given with application such as target detection in night vision. Suggest a way to choose seed pixel in this applications. 4
- Q6. a) What is region representation and description? Explain various regional descriptors. 5
b) Define edge detection. What is the limitation of gradient based edge detection? Are sobel masks appropriate for all images? Justify your answer. 5
- Q7. a) Find a set of code words and average word length using Huffman coding scheme for a set of input gray levels with probabilities as given below: 7

Input	S1	S2	S3	S4	S5	S6	S7	S8
Probabilities	0.02	0.15	0.03	0.15	0.05	0.20	0.10	0.30

- Compute the lowest possible average bits per gray level required to represent this data. 3
b) Define chain code. Does the use of chain code compress the description information of an object contour?

x-x-x

