Exam. Code: 1000
Sub. Code: 34991

2015

M.E. (Computer Science and Engineering)

Second Semester

CS-8201: Digital Image Processing

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.***

x-x-x

Q1 a) Define the term Brightness, contrast and simultaneous contrast . (5× 2)

b) What are the different types of operations that are generally performed in image processing?

c) How a gray level image can be converted into a pseudo color image?

d) What is the significance of histogram in image processing?

e) An image takes 480 KB for storage. The spatial resolution of the image is 600x200, find the gray level resolution.

UNIT - I

Q2 a) What is neighborhood processing and its advantages over pixel based operations (5,5)
Give filter masks for the following operations:
i) Image Sharpening filters
ii) Smoothing filters

b) Why and when an image is transformed to Fourier domain? Identify the property of Fourier transform which facilitates the design of Frequency domain filters. Compute the 2D DFT of (4x4) grayscale image having all pixel intensity values {1} and draw the Fourier spectrum.

Q3 a) What is meant by image degradation? Is it caused by noise present in an image? List different kinds of noise present in an image. Explain in detail the role of inverse filtering in image restoration. (5,5)

b) Apply full scale contrast stretch to the (4x4) -4 bit image given below:

10	8	9	7
8	2	4	7
9	12	15	13
4	13	15	12

Q4 What is the need of image compression? Name various image compression techniques. A source emits four symbols (A,B,C,D} with the probabilities 0.4, 0.2, 0.1 and 0.3 respectively. Construct arithmetic coding to encode and decode the word 'CAD'. Find the average length of the encoded string and efficiency of compression technique. (10)

P.T.O.

UNIT -II

Q5 a) Give names of basic morphological operations?. How these operations can be used to compute the gradient of an image. Discuss with an example.

b) Discuss Morphological based image Thinning and Thickening algorithm in brief. (5,5)

Q6 a) Name the three types of discontinuities present in the images. Explain the role of gradient in edge detection. Give different types of gradient-based edge detectors. (5,5)

b) Define the term image segmentation. Discuss with the help of an example, how Region splitting and merging approaches are used for image segmentation.

Q7 a) What do you understand by the terms: Image representation and description techniques. Are they similar or not? Justify your answer with example. (4,6)

b) Describe in brief various boundary and region description techniques and Discuss the concept of object recognition in brief?

x-x-x