



Reg. No. :

Name :

**Sixth Semester B.Tech. Degree Examination, March 2015
(2008 Scheme)**

08.626 : Elective – II : DIGITAL IMAGE PROCESSING (TA)

Time : 3 Hours

Max. Marks : 100

PART – A

(Answer **all** questions).

1. What is sampling ? When and where will be use non-uniform sampling ?
2. What are the ways of measuring distance between pixels ? Describe briefly.
3. State and prove the translation property of 2D DFT.
4. State the salient features of median filtering.
5. Give the marks for detecting $\pm 45^\circ$ slanting lines.
6. A digital image consists of pictures of three objects ABC. It is found that object A is represented by gray value between 80 and 100. Suggest an image processing technique by which the output image will consist of object A only. Explain this method.
7. A 256×256 pixel digital image for eight intensity levels. What is the minimum number of bits required to code this image in lossless manner and what will be the total number of bits in the coded image ? List the lossless coding techniques .
8. What is dilation ? What are the effects of dilation process ?
9. Define shape number.
10. Differentiate 4 and 8 directional chain codes.



(10×4=40 Marks)



PART - B

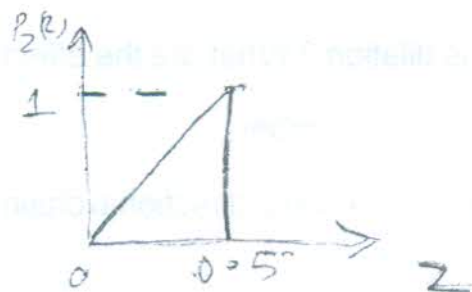
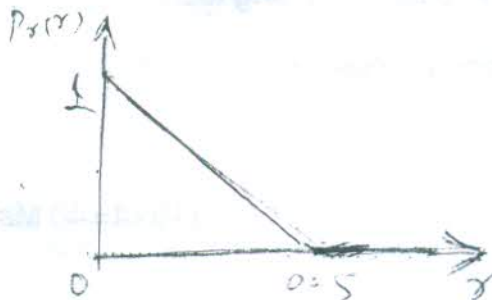
(Answer any 2 questions from each Module).

Module - 1

- An image is given by a 2D function $f(x, y) = 2 \cos [2\lambda (4x + 6y)]$ which is sampled with sampling frequency in x direction as 10 and y direction as 5.
 - Find the Fourier transform of the sampling function.
 - Fourier transform of the image after it has been low pass filtered.
 - In order to reconstruct the original image from the sampled data. What are the maximum intervals Δx , Δy that can be used and the limits of bandwidth of low pass reconstruction filter that can be used ?
- State and prove any three properties of two dimensional FT.
 - Compare DST, Walsh, Hadmard and KL transforms. State atleast one application of each.
- Find the LD Walsh basis for the fourth order system $N = 4$.

Module - 2

- With a block schematic explain homomorphic filtering. What are its applications ?
 - Obtain the low pass filter mask. What is the effect of application of low pass filtering on an image ?
- An image for the gray level probability density function $p_r(r)$ as shown in figure. It is desired to transform the gray levels of the image using the specified probability density function $p_z(z)$. Find the transformations in terms of 'r' and 'z' that will transform the image.



- Give the mathematical expression for a Wiener filter. State the advantages and disadvantages of Wiener filter over an inverse filter.



Module – 3

7. With a block schematic explain the transform based coding techniques. What are its advantages ?
8. a) Distinguish between global thresholding and local thresholding techniques for image segmentation.
b) Explain the technique of threshold selection based on histogram (c). What are the limitations of thresholding technique ?
9. What are structuring elements ? Briefly explain the standard binary morphological operations. **(6×10=60 Marks)**

