Government College of Engineering, Aurangabad

(An Autonomous Institute of Government of Maharashtra)

B.E. (ECT) Examination

End Semester Examination November 2016

ET445: Digital Image Processing

Time: Three Hours 23 NOV 2016 *Max. Marks: 60*

"Verify the course code and check whether you have got the correct question paper"

N.B.: -

1. *Attempt all questions*
2. *Figures to the right indicate full marks*
3. *Assume suitable data if necessary and state it clearly*
4. *Use of non-programmable calculator is allowed*

Q1 A Attempt any four of the following: 04

i) Define histogram.

ii) Enlist four image file types.

iii) State the formula for C_R and R_D.

iv) What is thresholding?

v) Define *'m'* connectivity.

B Attempt any two of the following: 04

i) Draw and define single sensor, sensor strip and sensor array.

ii) Write the concept used to zoom the image.

iii) What is the meaning of spatial domain and spatial frequency domain?

Q2 Attempt any three 12

i) Enlist steps for frequency domain filtering. State types of high pass filters.

ii) With suitable examples, discuss the arithmetic operations of image.

iii) Explain any three properties of 2D Fourier Transform.

iv) Develop an algorithm for median filtering of image.

v) Write in brief about color image processing.

Q3 A Attempt any three of the following: 06

i) What is contrast stretching?

ii) Compare enhancement and restoration.

iii) What is ringing effect?

iv) State digital operations analogous to union and intersection.

v) Give one example of mask for low pass and high pass filtering.

B Attempt any four of the following: 16

i) Explain constrained least square filtering.

ii) Explain Hit-or-Miss transform.

iii) Describe lossy compression.

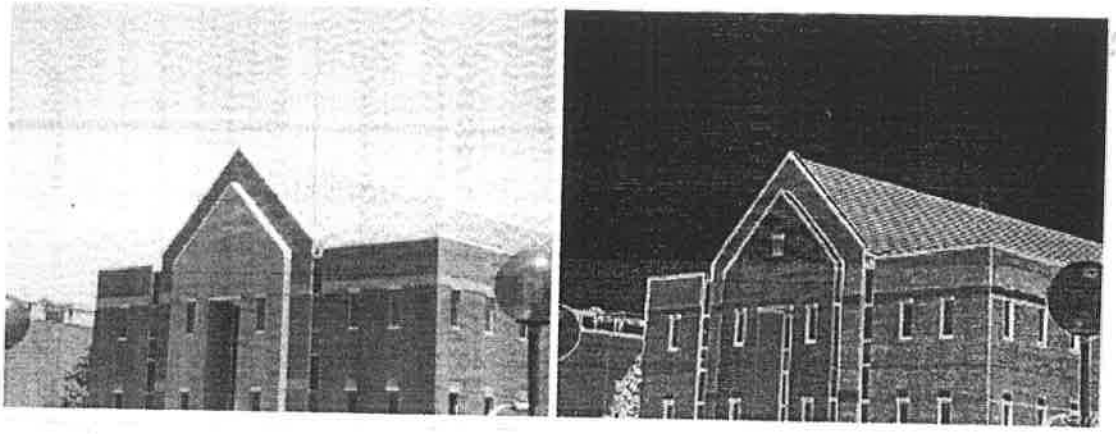
iv) Write about point and line detection using various masks.

v) Draw the block diagram of steps involved in digital image processing and discuss any one block.

vi) What is image restoration? Discuss geometric transformations in concern with it.

Q4 Attempt any two of the following: 12

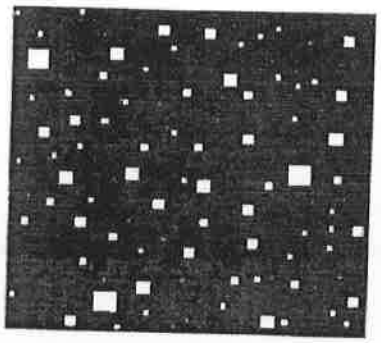
i)



Input Image Output Image

Suggest the algorithm to get above shown output image from the input image. State the steps and explain.

ii) In following image, noise is to be removed. Which morphological operations are suitable for this? Define these operations, state their equations and explain.



iii) Height of person is to be measured. Is it possible using image processing techniques? Explain.

Q5 Attempt any one of the following: 06

i) Analyze the effects of any four gray level transformations for enhancing the image. Explain each transformation.

ii) Construct the IGS code of the given gray level dataset
{ 100, 110, 124, 126, 130, 110, 200, 210}
Construct the Hamming code so as to make it suitable for transmission. Use even parity. Analyze the compression ratio.