Digital Image Processing Question Bank

UNIT –I

April/May 2009 (Refer Solution)

1) What are the different elements of DIP system .Explain?   (10)

2) Explain with example a) Neighbors of pixel b) Connectivity   (10)

3) How many minutes would it take to transmit a 1024 * 1024 image with 256 gray levels using
   a 56k band modem? Explain it.   (10)

December 2009

1) What do you mean sampling? State Explain this into image processing?   (10)

2) What are the different transforms used in DIP. Explain the most advantageous one detail. (10)

3) Explain resolution with image processing .Also write on spatial level resolution?   (10)

April/May 2010

1) Explain with block diagram, fundamental steps in digital image processing.   (10)

2) What are different operations used in DIP? Describe each with example.   (10)

3) Give the condition (s) which the D_4 distance between two point p and q is equal to the shortest
   4 –path between these points .Is this path unique ? Explain in detail.   (10)

December 2010

1) What are different statistical properties? Explain one with example.   (10)

2) Develop an algorithm for converting one pixel thick 8 path to 4 path.   (10)

3) Write note on image sensing and acquisition.   (10)

April/May 2011

1) Explain in detail fundamental steps in DIP   (10)

2) Explain image sensing and acquisition in detail   (10)

3) Explain the following in brief :

   i) DCT   ii) Walsh Transform iii) Hadmard Transform iv) wavelet transform

December 2011

1) Explain basic elements of digital Image Processing system   (10)

2) Write short note on :   (10)

   i) Image acquisition using sensor arrays

   ii) Image sampling and quantization

3) Explain :   (10)

i) Basic pixel relationship

ii)Walsh –Hadmard Transform

April/May 2012

1) Explain and draw fundamental Image processing system.   (10)

2) Explain statistical properties of digital image.   (10)

3) Explain spatial & Gray level resolution   (10)

December 2012

1) Give the examples of fields that use DIP.   (10)

2) i) State & explain statistical properties of the image.   (05)

   ii) Based on pixel relationship explain 4-adjacency ,8-adjacency and m-adjacency.   (05)

3) i) How a continuous image is converted into digital form.   (05)

   ii)Explain image acquisition using sensor array.   (05)

April/May 2013

1)   Explain with block diagram of fundamental steps in digital image processing.   (10)

2)   Define sampling & quantization of image? Explain image representation process in digital image processing.   (10)

3)   Compute the Hadamard transform of the image shown.   (10)

$$\begin{bmatrix} 2 & 1 & 2 & 1 \\ 1 & 2 & 3 & 2 \\ 2 & 3 & 4 & 3 \\ 1 & 2 & 3 & 2 \end{bmatrix}$$

Nov/Dec 2013

1)   What are different operations used in DIP ? Describe each with example.   (10)

2)   Explain with example. i)Neignbors of pixel ii) Connectivity.   (10)

3)   Explain the following terms in brief

   i)   DCT   ii) Walsh Transform

   ii)   Hadmard Transform   iv) Wavelet transform   (10)

UNIT II

April/May 2009(Refer Solution)

1) Develop a procedure for computing the median of an n*n neighborhood .Propose a technique for updating the median as the center of the neighborhood is moved from pixel to pixel . (10)

2) Under what conditions does the Butterworth low pass filter $H(u,v)=1/1+ [D(u,v)/Do]^{2n}$ becomes an ideal low pass filter ? Explain   (10)

3) Explain the discrete histogram equalization technique?   (10)

December 2009

1) Explain process of image smoothing using Median filtering?   (10)

2) How first and second derivative enhance the image ? Explain which is more enhance?   (10)

3) An image segment is show below .let V be the set of gray level values used to define connectivity in the image .Compute D4 ,D8 and Dm distances between pixel p & q for   (10)

   a) v = { 0,1}   b) v = {1,2}

				q
3	1	2	1	
2	2	0	2	
1	2	1	1	
1	0	1	2	

p

April/May 2010

1) Discuss the limiting effects of repeatedly applying a 3x3 low pass spatial filter to a digital image .you may ignore border effects.   (10)

2) Show the high pass filtering image in frequency domain can be obtain by using the method of subtracting a low pass filtering image from original.   (10)

3) Explain why the discrete histogram equalization technique will not in general yield flat histogram.   (10)

December 2010

1) Explain the process of image smoothing using any one.   (10)

2) What are different enhancement operations? Explain any one with example.   (10)

3) What effect would setting to zero the lower order bit planes have on histogram of an image in general ? what would be the effect of histogram if we set to zero the higher order bit planes.   (10)

April/May 2011

1) Define Histogram processing and explain the basic gray level transformation.   (10)

2) Explain the use of first and second order derivative for image processing.   (10)

3) For the images A and B shown below perform the following logic operations.   (10)

   1) A.B   2) A + B   3) A $\oplus$ B   4) $\bar{A}$ 5) $\bar{A}$ .B
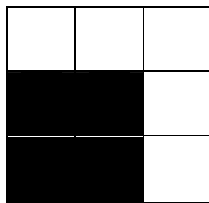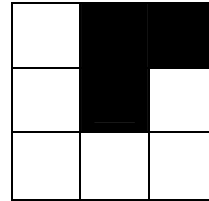
A   **B**

December 2011

1) Explain enhancement of image using Arithmetic and logical operation   (10)

2) What are the conditions to convert the butter worth low pass filter

   $H(u,v) = 1/1 + [D(u,v)/Do]^{2n}$ to an ideal low pass filter .   (10)

3) Write a note on :

   i)   Sharpening spatial filters.

   ii)   Smoothing spatial filters.   (10)

April/May 2012

1) Explain the second order derivative in image enhancement.   (10)

2) What is histogram ? The frequency table for the gray levels of an image is as given

   below.   (10)

Gray Level	0	1	2	3	4	5	6	7
h/e	100	90	50	20	0	0	0	0

3) Explain different filters for smoothing and sharpening.   (10)

December 2012

1) Suggest a suitable filter that will reduce the impact of salt and pepper noise .Justify your

   answer.   (10)

2) Explain image enhancement using arithmetic logical operator.   (10)

3) What is histogram equalization? Explain any one detail.   (10)

April/May 2013

1) Why histogram processing is important ? Explain histogram equalization technique? (10)

2) Explain various arithmetic operation useful for image enhancement.   (10)

3) What are high pass frequency domain filters ? Explain any one.   (10)

Nov/Dec 2013

1) Develop a procedure for computing the median of an n×n neighborhood propose a technique for updating the median as the centre of neighborhood is moved from pixel to pixel.   (10)

2) How first & second order derivative enhance the image ? Explain which is more enhance?   (10)

3) Explain why the discrete histogram equalization technique will not in general yield flat Histogram.   (10)

UNIT III

April/May 2009(Refer Solution)

1) Discuss on Error Free compression Model?   (10)

2) Explain different Error Free compression Codings?   (10)

3) Determine which bit, if any, is in error in the hamming encoded message 1100111, 1100110 and 1100010.what are the decoded values?   (10)

December 2009

1) What are the different coding techniques used in DIP? Explain any one   (10)

2) Explain Lossy Predictive coding Model?   (10)

3) Explain any image compression process in detail?   (10)

April/May 2010

1) Discuss digital image compression with three basic data redundancies   (10)

2) Explain the Huffman Coding in brief with example.   (10)

3) Use hamming (7,4) code to code the IGS quantized data given in table below   (10)

Pixel	Gray Level	Sum	IGS Code
i-1	NA	0000 0000	NA
i	0110 1100	0110 1100	0110
i+1	1000 1011	1001 0111	1001
i+2	1000 0111	1000 1110	1000
i+3	1111 0100	1111 0100	1111

December 2010

1) Explain JPEG baseline coder and decoder.   (10)

2) The following six symbols and their probabilities are given in tabular form. Generate Huffman code for them.

   Symbol: a1   a2   a3   a4   a5   a6

   Probability: 0.1   0.4   0.06   0.1   0.04   0.3   (10)

3) Write note on image compression standards.   (10)

April/May 2011

1) Explain Run length Coding technique with example.   (10)

2) Explain Image compression model and the compression process.   (10)

3) Explain a lossless predictive coding model.   (10)

December 2011

1) Explain the image compression model in detail.   (10)

2) Write a note on :   (10)

      i)   Lossless predictive coding.

      ii)   Lossy predictive coding.

3) With the help suitable example and diagram explain.   (10)

      i)   Working of JPEG Baseline sequential coder.

      ii)   Discrete cosine transform for image coding and compression.

April/May 2012

1) Explain the image compression model   (10)

2) Explain encoder and decoder of Lossy predictive coding.   (10)

3) Explain Huffman coding.   (10)

December 2012

1) Mention importance of image compression and explain image compression model in detail.   (10)

2) Explain lossy predictive coding.   (10)

3) Explain LZW coding technique.   (10)

April/May 2013

1) What are different image compression standards? Explain compression Model with block diagram in detail.   (10)

2) What are different image compression standards? Explain compression Model with block diagram in detail.   (10)

3) An alphabet and its symbol probabilities are given as

Symbol	a1	a2	a3	a4	a5	a6
Probability	0.1	0.4	0.06	0.1	0.04	0.3

Construct the Huffman tree and find out length bit code.   (10)

Nov/Dec 2013

1) What are the different coding techniques used in DIP? Explain any one .   (10)

2) Discuss digital image compression with three basic data redundancies.   (10)

3) Use hamming (7,4) code to code the IGS quantized data given in table below   (10)

Pixel	Gray Level	Sum	IGS Code
i-1	NA	0000 0000	NA
i	0110 1100	0110 1100	0110
i+1	1000 1011	1001 0111	1001
i+2	1000 0111	1000 1110	1000
i+3	1111 0100	1111 0100	1111

UNIT IV

April/May 2009

1) Discuss the Color Models   (10)

   a) R.G.B   b) H.S.I

2) Explain the spatial transformation in DIP   (10)

3) Write in detail gray level interpolation based on the nearest neighbor concept.   (10)

December 2009

1) What are the different mean filters used for restoration? Explain any one.   (10)

2) Write note on   a) RGB   b) HSI   (10)

3) Explain the color conversion with appropriate method in detail.   (10)

April/May 2010

1) Explain block diagram of color image enhancement in brief.   (10)

2) Discuss in detail geometric transformation in terms of DIP.   (10)

3) Explain in detail a model of image degradation process.   (10)

December 2010

1) What are different image restoration methods? Explain least square restoration in   (10)
   detail.

2) Explain Pseudo color image processing.   (10)

3) Explain the followings with reference to geometric transformation: (10)

   A) Rotation

   B) Scaling

   C) Translation

April/May 2011

1) Which are different mean filters used for image restoration in spatial domain? Explain
   any one in detail.   (10)

2) Explain Wiener filtering and geometric mean filtering.   (10)

3) Explain HSI color model and converting colors from HIS to RGB   (10)

December 2011

1) Explain image degradation model with help of following points.   (10)

   i)   Noise models.

   ii)   Salt and Pepper Noise.

   iii)   Experimental Noise.

    iv)   Periodic Noise.

2) Write a detailed explanation of spatial transformation in DIP with the help of suitable example.   (10)

3) Explain color model with respect to following points.   (10)

    i)   RGB Color model

    ii)   HSI Color model.

April/May 2012

1) Explain model of image degradation.   (10)

2) Explain color image processing technique.   (10)

3) Explain gray level interpolation for geometric transformation in detail.   (10)

December 2012

1) What is difference between image restoration and enhancement? Also write commons between them.   (10)

2) Discuss RGB model with an example.   (10)

3) Give Mathematical expression for Wiener filter .Also give the advantages and disadvantages.   (10)

April/May 2013

1) Explain in detail image degradation model.   (10)

2) Discuss the HIS colour model and Explain the process of converting colours from HSI to RGB.   (10)

3) What are the different filters used for image restoration ? Explain wiener filter in detail.   (10)

Nov/Dec 2013

1) What are different mean filter used for restoration ? Explain any one.   (10)

2) Explain the colour conversion with an appropriate method in detail.   (10)

3) Explain in detail spatial transformation in DIP.   (10)

UNIT V

April/May 2009 (Refer Solution)

1) Explain global processing via Hough transform.   (10)

2) What are the gradient operation? What are the various operators used for image segmentation based on edge detection? Explain   (10)

3) What do you understand by dialation and erosion operation in morphological operation? Explain in brief?   (10)

December 2009

1) Explain global processing using Hough transform.   (10)

2) What are the different techniques for detection of discontinuous? Explain advantageous one only.   (10)

3) Write note on image segmentation in detail.   (10)

April/May 2010

1) Discuss different three detection of discontinuities using 3x3 mask.   (10)

2) Does the zero-crossing method for edge finding always result in edges that are close to contours? Give reason.   (10)

3) What do you understand by thresholding the image? Explain in brief.   (10)

December 2010

1) Explain region growing and splitting   (10)

2) Explain Various boundary descriptors.   (10)

3) Explain how signature is a 1 dimensional representation of boundary with suitable example.   (10)

April/May 2011

1) Explain Edge detection method and also compare the response between first and second order derivative.   (10)

2) What do you mean by region growing in region segmentation?   (10)

3) Write note on image segmentation in detail.   (10)

December 2011

1) What are dilation and erosion operation in morphological operation? Explain with (10) examples.

2) Write a note on :   (10)
   i)   Image segmentation using second order derivative (The Laplacian).
   ii)   Local and Global Thresholding.

3) Explain Image Representation with i) Chain codes and ii) Signature.   (10)

April/May 2012

1) Explain point segmentation, Line & Edge segmentation detection.   (10)

2) How Hough transform can be used for global processing.   (10)

3) What are different principle components for description Explain any one.   (10)

December 2012

1) Explain different image representation schemes.   (10)

2) Describe the region growing techniques used for image segmentation and mention the problems associated with it.   (10)

3) What do you mean by thresholding the image? Describe global and local thresholding.

(10)

April/May 2013

1) What is mean by image segmentation? Explain Hough Transform in detail.   (10)

2) What is thresholding? Enlist the type of thresholding and explain any one of them in brief.   (10)

3) Discuss in brief three principle approaches used in image processing to describe texture of a region.   (10)

Nov/Dec 2013

1) Discuss different three detection of discontinuities using 3×3 mask.   (10)

2) Explain various boundary descriptors.   (10)

3) What do you understand by thresholding the image? Explain in brief.   (10)