Part- A (25 Marks)

1.a) Define image resolution.  
   b) What are the steps involved in DIP? 
   c) Specify the objective of image enhancement techniques. 
   d) Differentiate between linear spatial filter and non-linear spatial filter. 
   e) What is meant by image restoration? 
   f) What is inverse filtering? 
   g) Define region growing. 
   h) What are the three types of discontinuity in digital image? 
   i) Define huffman coding.  
   j) What are different compression methods?

Part-B (50 Marks)

2.a) What is meant by digital image processing? What are the applications of it? How an image is represented digitally? 
   b) Non uniform sampling is useful for what type of images. Give reasons. 

   OR

3.a) Is fast algorithm applicable for computation of Hadamard transform, if so what are the problems encountered in implementation. 
   b) Explain Discrete Cosine Transform and specify its properties. 

4.a) What is a histogram of an image? Sketch histograms of basic image types. 
   b) Discuss how histogram is useful for image enhancement. 

   OR

5. What are the techniques used for image smoothing? Explain any one spatial and one frequency techniques used for image smoothing. 

6. Describe constrained least square filtering technique for image restoration and derive its transfer function.

   OR

7. Describe with mathematical model, both constrained and unconstrained restoration.
8.a) Explain the segmentation techniques that are based on finding the regions.  
b) Write the applications of segmentation. [7+3]  

OR

9.a) Explain any two methods for linking the edge pixels to form a boundary of an object.  
b) Explain with examples morphological operations dilation and erosion. [7+3]  

10.a) Explain the schematics of image compression standard JPEG.  
b) Draw and explain a general compression system model. [5+5]  

OR

11.a) Describe in detail the lossless predictive coding error free compression.  
b) Explain briefly the transform based compression. [5+5]  

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PART- A

1.a) Define Weber Ratio                      [2]
b) What is city block distance          [3]
c) What is mean by Image Subtraction? [2]
d) What are Piecewise-Linear Transformations [3]
e) What is degradation function? [2]
f) What is Gray-level interpolation? [3]
g) What are the logic operations involving binary images [2]
h) What is convex hull? [3]
i) Define Compression Ratio [2]
j) What is Arithmetic Coding? [3]

PART- B

2.a) Discuss the role of sampling and quantization with an example.
    b) With a neat block diagram, explain the fundamental steps in digital image processing.[5+5]

OR

3.a) Discuss the Relationship between Pixels in detail.
    b) Discuss optical illusions with examples. [5+5]

4.a) State different types of processing used for image enhancement.
    b) Explain in detail smoothing frequency-domain filters related to images. [5+5]

OR

5.a) Explain any two methods used for digital image zooming and shrinking.
    b) Discuss two dimensional orthogonal unitary transforms. [5+5]

6.a) Discuss the minimum mean square error filtering.
    b) Explain the model of image degradation process. [5+5]

OR

7.a) Discuss in detail the Inverse Filtering.
    b) Write about Constrained Least Squares Restoration in detail. [5+5]

8.a) Write Edge Linking And Boundary Detection.
    b) Write about detection of discontinuities. [5+5]

OR

www.ManaResults.co.in
9. a) Discuss the Region Oriented Segmentation.
   b) Explain about Hit or Miss Transformation. [5+5]

10. a) Explain about Lossy and Lossless Predictive Coding
    b) Explain about the methods of removal of redundancy. [5+5]

   **OR**

11. a) Discuss the Transform Based Compression.
    b) Write a short note on JPEG 2000 Standards. [5+5]

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Code No: 117CJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, November/December - 2017
DIGITAL IMAGE PROCESSING
(Common to ECE, ETM)

Time: 3 Hours
Max. Marks: 75

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A

1.a) Define Sampling and Quantization. [2]
b) List the properties of Walsh Transform. [3]
c) Define histogram. [2]
d) What is the need of image enhancement? [3]
e) What is the difference between image restoration and image enhancement? [2]
f) Draw the model of Image Restoration process. [3]
g) List different types of discontinuities in digital image. [2]
h) What is global, Local and dynamic threshold? [3]
i) What is the need of image compression? [2]
j) Give the characteristics of lossless compression. [3]

Part- B

2. With mathematical expressions explain the Slant transform and explain how it is useful in Image processing. [10]

OR

3.a) List and explain the fundamental steps in digital image processing.
b) Discuss briefly the following:
   i) Neighbours of pixels
   ii) connectivity. [5+5]

4.a) Explain the use of histogram statistics for image enhancement.
b) How Gray level transformation helps in contrast enhancement? Discuss. [5+5]

OR

5.a) Compare and contrast spatial domain and frequency domain techniques of Image enhancement.
b) Discuss any one frequency domain technique of Image smoothing. [5+5]

6. What is meant by image restoration? Explain the image degradation model. [10]

OR

7. Discuss in detail the image restoration using inverse filtering. [10]
8.a) Explain the basics of intensity thresholding in image segmentation. 
b) Explain about morphological hit-or-miss transform. [5+5] 

OR

9.a) Discuss in detail the edge linking using local processing. 
b) Discuss briefly the region based segmentation. [6+4] 

10.a) Discuss briefly the Image compression using Huffman coding. 
b) What is the importance of compression in Image processing? [7+3] 

OR

11.a) Draw and explain the image compression model. 
b) List and explain the steps involved in JPEG compression. [6+4] 

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