Digital Image Processing

Question Bank

Unit 01

SHORT ANSWER TYPE

1. List the steps involved in digital image processing.
2. Specify the basic components of image processing system.
3. Illustrate the term 'Image'.
4. Mention the applications of image processing
5. Classify image sensing sensors and give short note
6. What are the primary and secondary colours.
7. Short answer about the terms: Hue, Saturation, Grey level
8. How a digital image can be represented?
9. Construct the photonic electromagnetic spectrum.
10. Identify the various multispectral bands and their applications
11. Differentiate brightness and contrast
12. Identify the difference between regions and boundaries
13. the steps for analog to digital conversion, state its need.
14. Compare Brightness and Contrast

LONG ANSWER QUESTIONS :

1. In detail explain the fundamental steps involved in digital image processing systems.
2. What are the components of digital image processing system? Explain each in detail.
3. Explain in detail about image acquisition system
4. Illustrate how the image is digitized by sampling and quantization process
5. Describe in detail about: Various sensors
6. Evaluate the various colour models. Explain each of them in detail.
7. Define briefly the following terms: i) image restoration, ii) Compression, iii) Segmentation, iv) morpological processing
8. Analyze the various parameters of image processing i) Band number ii) Spectrum, iii) wave lengths, iv) applications.

9. What is sampling? Explain in detail.
10. Explain the steps involving in digital processing of image.
11. Explain the image acquisition process.
12. Explain the digital image representation and their applications.
13. Explain the colour image representation.
14. Explain the process of Analog to Digital Conversion.
15. Explain the Quantization process with suitable example.

Unit 02

SHORT ANSWER TYPE

1. What is meant by image filtering?
2. Summarize about histogram equalization
3. Explain the two categories of image enhancement.
4. Write expression for Gray, Log and Gamma transformations
5. Specify the need for image enhancement.
6. What is spatial domain method?
7. Identify the effect of under sampling process
8. Illustrate with examples for linear and nonlinear filters?
9. Evaluate the 2D sampling theorem
10. Define frequency domain method.
11. List various gray level transformation technique
12. Identify the IHPF, BHPF, GHPF frequency domain transfer functions
13. Recall the term histogram specification
14. Describe about Histogram?
15. Identify the properties of fourier transform

16. Distinguish between smoothing and sharpening filters
17. Categorize the various frequency domain filters.
18. Construct the 2D fourier transform and its inverse
19. Explain the mechanics of spatial filtering
20. Estimate the link between spatial and frequency domain filtering.

LONG ANSWER QUESTIONS :

1. Explain the histogram equalization method of image enhancement.
2. Explain histogram specification technique in detail with equations.
3. Develop the basics to explain with example:
    i) Spatial smoothening
    ii) Spatial sharpening
4. Write detail note about
    i) Spatial domain enhancement
    ii) Frequency domain enhancement

5. Show the various techniques in frequency domain to enhance a image with necessary examples
6. Distinguish spatial correlation and convolution. Explain each with identical example.
7. Illustrate the 2D fourier transform and its pair. State and prove their properties.
8. Discuss the following spatial enhancement techniques a) Spatial averaging b) Median filtering
9. Compare the various image transformation technique

10. Compare the various filters available under frequency domain for image enhancement
11. With example explain in detail about spatial averaging.
12. Describe in detail about various types of mean filters.
13. Compare smoothing & sharpening in frequency domain
14. Distinguish between spatial & frequency domain image enhancement
15. Analyze the performance of following sharpening filters Ideal HPF
16. What is histogram. Explain the histogram processing with example.
17. Explain the Spatial Filtering with suitable example.
18. Explain Fourier transformation and its properties.
19. Explain the colour models for image processing.
20. Explain the Pseudo colouring process with suitable example.
21. Explain the frequency domain filtering with its types.
22. Explain the homomorphism filtering with suitable example.

Unit 03

SHORT ANSWER TYPE

1. What is meant by Image Restoration?
2. What are the two properties in Linear Operator?
3. Explain additivity property in Linear Operator?
    a. How a degradation process is modeled?
    b. Explain homogenity property in Linear Operator?
4. Give the relation for degradation model for continuous function?
    a. Define circulant matrix?
    b. What is concept algebraic approach?

5. What are the two methods of algebraic approach?
    a. Define Gray-level interpolation?
6. What is meant by Noise probability density function?
7. Why the restoration is called as unconstrained restoration?
8. Which is the most frequent method to overcome the difficulty to formulate the spatial relocation of pixels?
9. What are the three methods of estimating the degradation function?
10. What are the types of noise models?
11. Give the relation for rayleigh noise?
12. Give the relation for Gamma noise?
13. Give the relation for Exponential noise?
14. Give the relation for Uniform noise?
15. Write the properties of Singular value Decomposition (SVD)?
16. What is inverse filtering?
17. What is pseudo inverse filter?
18. What is meant by least mean square filter?
19. Draw the model of image degradation process.

LONG ANSWER QUESTIONS :

1. What is image degradation and restoration? Explain them with example.
2. Explain the Noise model for image restoration.
3. Explain the inverse filtering with suitable example.
4. Explain the Homomorphism filtering.
5. Explain the process of filtering and Compare all filtering methods.
6. With suitable example explain the noise effect in image processing.
7. Write a short notes on a) Image restoration b) Image Degradation.

c) Homomorphism Filtering d) Inverse Filtering

8. What are the two approaches for blind image restoration? Explain in detail.
9. What is image restoration? Explain the degradation model for continuous function in detail.

Unit 04

SHORT ANSWER TYPE

1. What is image compression?
2. What is Data Compression?
3. What are two main types of Data compression?
4. What are different Compression Methods?
5. Define is coding redundancy?
6. Define interpixel redundancy?
7. What is run length coding?
8. Define compression ratio.
9. Define encoder
10. Define source encoder
11. Define channel encoder
12. What are the types of decoder?
13. What are the operations performed by error free compression?
14. Define Huffman coding
15. Define instantaneous code
16. Define uniquely decodable code 21. Define B2 code
17. Define the procedure for Huffman shift
18. Define arithmetic coding
19. What is bit plane Decomposition?

20. What are three categories of constant area coding?
21. How sub image size selection affect transform coding error.

LONG ANSWER QUESTIONS :

1. What is data redundancy? Explain three basic data redundancy?
2. What is image compression? Explain any four variable length coding compression schemes.
3. Definition of image compression
4. Explain about Image compression model?
5. Explain about Error free Compression?
6. Explain about Lossy compression?
7. Explain the schematics of image compression standard JPEG.
8. Differntiate between lossless and lossy compression and explain transform coding system with a neat diagram.

Unit 05

SHORT ANSWER TYPE

1. What is segmentation?
2. Write the applications of segmentation
3. What are the three types of discontinuity in digital image?
4. How the derivatives are obtained in edge detection during formulation?
5. Write about linking edge points.
6. What are the two properties used for establishing similarity of edge p What is edge?
7. Give the properties of the second derivative around an edge?

8. Define Gradient Operator?
9. What is meant by object point and background point?
10. What is global, Local and dynamic or adaptive threshold?
11. Define region growing?
12. Define shape numbers
13. Describe Fourier descriptors 16 Define chain codes?
14. What are the demerits of chain code?
15. What is thinning or skeletonizing algorithm?
16. Specify the various image representation approaches
17. What is polygonal approximation method?
18. Specify the various polygonal approximation methods.
19. Name few boundary descriptors
20. Give the Fourier descriptors for the following transformations
21. Define length of a boundary.
22. Define eccentricity and curvature of boundary

LONG ANSWER QUESTIONS :

1. Discuss about region based image segmentation techniques. Compare threshold region based techniques. Define and explain the various representation approaches?
2. Explain Boundary descriptors in detail with a neat diagram..
3. Explain regional descriptors.
4. Explain the two techniques of region representation
5. Explain the segmentation techniques that are based on finding the regions directly.
6. How is line detected? Explain through the operators