

## **Image Processing Question Bank**

### **Unit 1**

1. Enlist various fundamental steps in Digital image Processing with a neat block diagram.
2. Explain image formation in the eye.
3. Explain about practical examples of EM spectrum.
4. Discuss the image acquisition using a single sensor, sensor strips and sensor arrays.
5. Explain three different level processes in image processing.
6. Explain the elements of an image processing system.
7. Define Gaussian noise and its probability density function.
8. Explain the function of image sensor.
9. Differentiate between image enhancement and image restoration.
10. Explain the theory of sampling of an image.
11. Prove that median filter is a nonlinear filter with an example.
12. Define an image. List out and explain the various areas of applications of image processing
13. Explain about image acquisition.

### **Unit 2**

1. Describe the Haar transform in image processing with suitable expressions.
2. Explain linear versus non linear operations.
3. Explain in detail about basic gray level transformations.
4. Explain various frequency domain filter approaches for image enhancement.
5. Why histogram equalization is needed? Illustrate histogram equalization with an example.
6. Explain the basic concept of any two methods piecewise linear transformation function used in image enhancement.
7. What is the need for transform? What is Image transform and list the applications of Image transform.
8. Write short notes on log transformation.
9. What is the objective of Image enhancement? Define Spatial domain.
10. Briefly explain about Image enhancement using Point processing technique.
11. Discuss how the various filter masks are generated to sharpen images in spatial filters.
12. Explain image negative transformation.
13. Give any five properties of two dimensional DFT.
14. Explain the use of first derivative for image enhancement by taking a  $3 \times 3$  region of image using the magnitude of the gradient.
15. Write the drawback of inverse filtering.
16. Define gradient of an image.

17. Define histogram equalization. Explain the procedure for histogram equalization.
18. Define convolution and explain its use in image processing.
19. Define laplacian of Gaussian.
20. Explain about the discrete cosine transform and write its applications.
21. Explain about image smoothing using Ideal low pass filter.
22. Explain about local histogram processing.
23. Explain the operation of color image smoothing and sharpening.
24. Define 2D DFT. Prove the convolution property of 2D DFT

### **Unit 3**

1. Differentiate Image Enhancement in Spatial domain and in frequency domain.
2. Explain in detail about Constrained least square filtering.
3. Define DFT. State and prove the following properties: (i) Correlation (ii) Scaling (iii) Periodicity
4. Write short note on Notch filters.
5. What do you meant by wavelet packet?
6. Explain frequency aliasing.
7. Compare Fourier transform and Fourier Series.
8. Explain the periodic noise reduction by frequency domain filtering with respect to notch filter.
9. Explain Homomorphic filtering in detail.
10. Define Brightness, Hue and saturation.
11. Explain the colour fundamentals.
12. Explain the concept of Full color image processing.
13. What is a Colour? Write various types of colour aspects.
14. What is color? Define color image processing and enlist various types of color image processing.
15. With help of block diagram explain about full color image processing.
16. Illustrate homomorphic filtering approach for image enhancement.
17. Describe the histogram based processing in color images.
18. Explain in detail about the HSI and CMYK color spaces.
19. Explain the procedure for converting colors from RGB to HIS and vice versa.
20. Explain color complements.
21. Discuss any two color model used in color image processing.
22. Write short note on CMYK color model.
23. Explain about HSI color model.
24. Write the purpose of color model.
25. Explain about RGB color model.
26. Write short notes on color slicing.
27. What is a chromacity diagram? Explain CIE chromacity diagram

#### **Unit 4**

1. Discuss Huffman coding with example for image compression.
2. Define redundancy. Write the various types of redundancy techniques.
3. Draw the image compression model and describe the work of each block.
4. Define the terms Data Compression & Compression Ratio. What are the types of data Compression?
5. With neat sketches explain Wavelet coding technique.
6. Describe arithmetic coding with an example for compression of image.
7. Define spatial and temporal redundancy.
8. What are the different image compression standards? Explain.
9. Compare orthogonal and biorthogonal wavelets.
10. Define compression and explain the general compression system model.
11. What is the need of compression? Explain about vector quantization method
12. Explain about Run Length coding with an example.

#### **Unit 5**

1. Explain opening and closing operations.
2. Explain the concept of morphological Watersheds.
3. Discuss about image segmentation based on color.
4. Discuss point detection, line detection and edge detection with an example.
5. Explain Convex Hull with neat sketch.
6. Compare Constrained restoration and Unconstrained restoration.
7. Write short note on grey scale morphology.
8. Specify some fundamental conditions of segmentation.
9. Explain about segmentation based on discontinuities and segmentation based on Similarities. Explain the concept of Hit or Miss Transformation
10. Discuss segmentation using morphological watersheds.
11. Explain about color image segmentation.
12. Explain about erosion operation.
13. Explain watershed transformation and discuss about its advantages and disadvantages.
14. Define image segmentation. Give classification. Explain region based segmentation.
15. Prove that erosion and dilation are dual to each other.
16. Discuss about Roberts, Prewitt and Sobel edge detectors.