**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**EC2029-DIGITAL IMAGE PROCESSING**

**QUESTION BANK**

**UNIT-I**

**PART-A**

1. Define Hue and Saturation.
2. What is mach band effect?
3. What is meant by dynamic range and contrast?
4. What is the purpose of color models? Give the hardware oriented types of color models.
5. What is dithering? List some commonly used dithering types.
6. Define subjective brightness and brightness adaption
7. Define Weber Ratio?
8. What is meant by mach band effect?
9. What is simultaneous contrast?
10. What is meant by illumination and reflectance?
11. Define sampling and quantization?
12. Find the number of bits required to store 256 X 256 image with 32 gray levels?
13. What do you mean by zooming of digital images?
14. What is simultaneous contrast?
15. What is geometric transformation?
16. What are the applications of digital image processing?
17. List the hardware oriented color models
18. What do you meant by zooming and shrinking of digital images
19. Distinguish between gray level resolution and spatial resolution
20. Justify that KLT is an optimal transform

**PART-B**

1. (i) Explain the principle, construction and working of vidicon camera in detail. (12)

 (ii) List the components of digital image processing systems. (4)

1. Explain briefly about the working principle of digital camera with neat sketch. (16)
2. (i) Explain the basic relationship between the pixels. (8)

(ii) What are the different transforms used in DIP? Explain any one with properties. (8)

1. (i) Explain KL transform with suitable equations and derive how an image is reconstructed using transformation function. (10)

(ii) How the image format is converted from RGB to HSI and HSI to RGB? (6)

1. (i) Briefly explain the working of Human eye with neat sketch. (8)

(ii) Explain in detail about sampling and quantization. (8)

1. What are the elements in digital image processing system and describes its working?(8) How this is used for weather forecasting applications? (8)
2. Discuss the features of Human visual perception and brightness adaptation property of human eye. (16)
3. i) Explain the four basic relationships between pixels. (8)

ii) What are the different transforms used in DIP? Explain the most advantageous one in detail? (8)

1. Explain the basic concepts of sampling and quantization with neat sketch. (16)
2. Obtain the KL transform for the given vectors X1=[1 0 0];X2=[1 0 1];X3=[1 1 0] (Transpose these vectors) and analyze how the principle components are used for remote sensing applications? (16)
3. Describe the elements of visual perception? (16)
4. i. Describe image formation in eye with brightness adaptation and discrimination? (8)

ii. write short notes on sampling and quantization? (8)

1. i. Describe the steps involved in digital image processing? (8)

ii. Describe the functions of elements of digital image processing system with a diagram? (8)

1. Explain in detail about vidicon camera tube? (16)
2. Explain in detail about HSI models? (16)
3. Explain in detail about vidicon camera tube? (16)
4. Describe the elements of visual perception? (16)
5. Obtain K-L transform for the given vectors X1=[1 0 0] x2=[1 0 1] x3=[1 1 0] (transpose these vectors) and analyse how principal components are use for remote sensing application (16)
6. Explain the basic concepts of sampling and quantization? (16)
7. i) What are the different transforms used in DIP? Explain most advantageous one in detail? (8)

ii) Explain four basic relationship between pixels? (8)

 **UNIT-II**

**PART-A**

1. Why KL transform is termed as an optimal transform?
2. Define high frequency emphasis filtering.
3. What is salt and pepper noise?
4. What is spatial averaging?
5. What is contrast stretching?\
6. Define image enhancement and give example.
7. What do you mean by point processing?
8. Define image averaging
9. Name the different types of derivative filters.
10. Define harmonic mean.
11. What is meant by image enhancement?
12. Give some examples of image enhancement process?
13. Mention the basic approaches of image enhancement?
14. What is mask processing?
15. Give some application of power -law transform?
16. What is Bit plane slicing?
17. What is histogram?
18. What are all the applications of histogram processing?
19. What is salt and pepper noise?
20. What is white noise?

**PART-B**

1. (i) Explain about spatial averaging and directional smoothing. (8)

(ii) What are the mean filters available in DIP? Explain each of them with suitable equations. (8)

1. (i) With the help of suitable mathematical equations briefly explain about reflectance-illumination model of frequency domain filtering. (10)

(ii) Explain briefly about the color image enhancement with neat sketch. (6)

1. (i) Write down the basic concepts and properties of median filtering. (8)

 (ii) Write short notes on the following:

1. Cones and rods (2)
2. Scotopic vision and photopic vision (3)
3. Image enhancement and image restoration. (3)
4. a) (i) What is histogram? How it is equalized to enhance the image? (8)

 (ii) Explain the overall procedure for histogram matching. (8)

b) (i) With neat sketch and relevant equations explain the noise distributions. (8)

 (ii) Explain the spatial domain techniques of image enhancement. (8)

1. Discuss in detail the homomorphic filtering and derivative filters (16)
2. What is histogram equalization? Discuss in detail about the procedure involved in histogram matching. (16)
3. Write short notes on directional smoothing. (16)
4. Discuss the procedure for color image enhancement. (16)
5. Specify the expressions for the following filters. (16)

a)Geometric mean filter

b)Contra harmonic mean filter

1. Explain spatial averaging in detail. (16)
2. What is histogram? explain histogram equalization? (16)
3. (i)Explain the types of gray level transformation used for image enhancement? (8)

(ii)Discuss image smoothening filter with its model in spatial domain (8)

1. i. what are image sharpening filter? Explain various type of it? (8)

ii. Explain spatial filtering in image enhancement? (8)

1. i. Explain detail about color image enhancement? (8)

ii. Explain in detail about directional smoothening? (8)

1. i. Explain image enhancement in frequency domain? (8)

ii. Explain Homomorphic filtering in detail? (8)

1. What is histogram equalization? Discuss in detail about histogram matching?(16)
2. Specify the expressions for the following filters (16)

 i. Geometric mean filter

 ii. Harmonic mean filter

 iii. contra harmonic mean filter

1. i. Write notes on homomorphic filtering? (8)

 ii. Discuss the image smoothening filter with its model in special domain?(8)

1. Explain in detail about color image enhancement? (16)
2. Explain in detail about (16)

(i)Image subtraction

(ii)image averaging