R19

Set No. 1

IV B. Tech I Semester Regular Examinations, November – 2022
DIGITAL IMAGE AND VIDEO PROCESSING
(Electronics and Communication Engineering)

Time: 3 hours   Max. Marks: 75

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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UNIT-I

1	a)	Illustrate the theory of image sampling and quantization.	[7]
	b)	What are the various image file formats? Briefly explain them.	[8]

(OR)

2	a)	Construct the Haar transformation matrix for N=8.	[7]
	b)	Explain the concept of Discrete Cosine Transform and describe it's importance.	[8]

UNIT-II

3	a)	Explain the various spatial domain approaches for image enhancement.	[7]
	b)	Distinguish image smoothing and image sharpening and explain the respective filters in frequency domain.	[8]

(OR)

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4	a)	Elucidate the various types of blur for image degradation.	[7]
	b)	Illustrate the concept of Blind de-convolution.	[8]

UNIT-III

5	a)	Explain the various types of edge detection.	[7]
	b)	What is the necessity of image segmentation and explain about the region based segmentation.	[8]

(OR)

6	a)	What is image redundancy? Explain the need of image compression and its model.	[7]
	b)	Discuss the wavelet-based image compression.	[8]

UNIT-IV

7	a)	Explain the 3-D motion models.	[7]
	b)	Explain the sampling of video signals.	[8]

(OR)

8	a)	Describe the concept of geometric image formation model.	[7]
	b)	Discuss the various filtering operations for processing video signals.	[8]

UNIT-V

9	a)	Explain the optical flow and its equation for motion estimation.	[7]
	b)	Make use of an example to explain the Block-Matching Algorithm.	[8]

(OR)

10	a)	Elucidate the concept of Multi resolution motion estimation.	[7]
	b)	Write the applications of motion estimation in video.	[8]
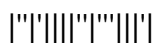
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UNIT-I

1	a)	Discuss the elements of image processing system.	[7]
	b)	Elucidate the convolution and correlation properties of 2D-DFT.	[8]
		(OR)	
2	a)	What is Hadamard transform? Briefly describe it with example.	[7]
	b)	What is Walsh transform? Derive its basis function.	[8]

UNIT-II

3	a)	Discuss the concept of Histogram equalization for image enhancement.	[7]
	b)	Explain the concept of selective filtering.	[8]
		(OR)	
4	a)	Illustrate the necessity of image restoration and restoration model.	[7]
	b)	Distinguish linear and non-linear image restoration techniques.	[8]

UNIT-III

5	a)	Elucidate the point, line and edge detection.	[7]
	b)	Explain the need of Hough Transform (HT) and what is Circular HT.	[8]
		(OR)	
6	a)	Classify and describe the various image compression schemes.	[7]
	b)	Illustrate the Shannon-Fano coding with an example.	[8]

UNIT-IV

7	a)	Discuss the processing of analog video.	[7]
	b)	Describe the various time-varying image formation models.	[8]
		(OR)	
8	a)	Discuss the concept of photometric image formation model.	[7]
	b)	Explain the filtering operations for video signal processing.	[8]

UNIT-V

9	a)	Explain the general methodologies for motion estimation.	[7]
	b)	Describe the concept of Global Motion Estimation.	[8]
		(OR)	
10	a)	Elucidate the concept of Mesh based motion estimation.	[7]
	b)	Make use of an example to explain the predictive coding approach.	[8]

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UNIT-I

1 a) Define an image and describe the applications of digital image processing. [7]
   b) Briefly describe the KL transform with example. [8]
(OR)
2 a) Illustrate the concept of image sampling and quantization. [7]
   b) Design Walsh basis for N=4. [8]

UNIT-II

3 a) Discuss the various point processing techniques for image enhancement [7]
   b) Distinguish smoothing and sharpening spatial filters. [8]
(OR)
4 a) Describe the image restoration using wiener filtering. [7]
   b) What is Blind de-convolution? Explain. [8]

UNIT-III

5 a) Classify and describe the types of segmentation approaches. [7]
   b) Explain the Edge detection and linking in detail. [8]
(OR)
6 a) With the help of neat functional block diagram explain the process of image compression with neat diagram. [7]
   b) Clearly describe the Huffman coding procedure with an example. [8]

UNIT-III

7 a) Discuss the processing of digital video. [7]
   b) Describe the various three-dimensional motion models for video signal processing. [8]
(OR)
8 a) Discuss the concept of geometric image formation model. [7]
   b) Explain the process of sampling for video signals. [8]

UNIT-V

9 a) Elucidate the concept of pixel based motion estimation. [7]
   b) With the help of an example, explain the Block-Matching algorithm. [8]
(OR)
10 a) Make use of waveform based coding for motion estimation. Compare the result with Block based transform coding. [7]
   b) Discuss the applications of motion estimation in video. [8]

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UNIT-I

1	a)	Define digital image and describe the elements of image processing system.	[7]
	b)	Explain the various image file formats.	[8]

(OR)

|			
2	a)	List the advantages of 2D-DFT. Explain the convolution property.	[7]
	b)	Briefly describe singular value decomposition.	[8]

UNIT-II

3	a)	Explain the process of Histogram equalization and specification.	[7]
	b)	Elucidate the process of inverse filtering.	[8]

(OR)

4	a)	What is image blur and discuss the types of image blur.	[7]
	b)	Briefly discuss the model of image restoration.	[8]

UNIT-III

5	a)	Discuss the need of image gradient in image segmentation.	[7]
	b)	Explain the need of edge linking using local processing.	[8]

(OR)

6	a)	Explain the process of image compression with the help of neat block diagram.	[7]
	b)	Illustrate the Arithmetic coding with an example.	[8]

UNIT-IV

7	a)	Elucidate the processing of analog and digital video.	[7]
	b)	Briefly describe the Three-dimensional motion models for processing the video signals.	[8]
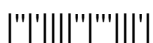
(OR)

8 a) Compare geometric and photometric image formation model.   [7]

    b) Explain the sampling process of video signals.   [8]

UNIT-V

9 a) Distinguish Mesh based and Global motion estimation techniques.   [7]

    b) Discuss the optical flow for motion estimation.   [8]

(OR)

10 a) Explain the region based motion estimation with figure.   [7]

    b) Write the applications of motion estimation in video coding.   [8]