Printed Page:- 04 **Subject Code:- ACSAI0522**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: III - THEORY EXAMINATION (2023- 2024)

Subject: Image Processing & Pattern Recognition

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION A **20**

1. Attempt all parts:-

1-a. The type of Interpolation where the intensity of the FOUR neighbouring pixels is used to obtain intensity a new location is called _____(CO1) 1

(a) cubic interpolation

(b) nearest neighbour interpolation

(c) bilinear interpolation

(d) bicubic interpolation

1-b. The range of values spanned by the gray scale is called:(CO1) 1

(a) Dynamic range

(b) Band range

(c) Peak range

(d) Resolution range

1-c. In Which of the following filter(s) results in a value as average of pixels in the neighborhood of filter mask.(CO2) 1

(a) Smoothing linear spatial filter

(b) Averaging filter

(c) Lowpass filter

(d) All of the above

1-d. A spatial averaging filter in which all coefficients are equal is called _____.(CO2) 1

(a) Box filter

(b) Square filter

(c) No filter

(d) None of the above

1-e. The technique for a gray-level transformation function is called _____, if the transformation would be to produce an image of higher contrast than the original by darkening the levels below some gray-level m and brightening the levels above m in the original image.(CO3) 1

(a) Contouring

(b) Contrast stretching

(c) Mask processing

(d) Point processing

1-f. In Which of the following derivatives produce a double response at step changes in gray level?(CO3) 1

(a) a) First order derivative

(b) b) Third order derivative

(c) c) Second order derivative

(d) d) First and second order derivatives

1-g. High contrast images are considered as(CO4) 1

(a) low resolution

(b) High resolution

(c) Blurred

(d) Noisy

1-h. Geometric transformation refers to(CO4) 1

(a) The process of transforming an image by changing its size, rotation or position

(b) The process of aligning two or more images

(c) The process of compressing an image to reduce its size

(d) The mathematical model used to describe the mapping between two

images

1-i. The visible spectrum ranges_____(CO5) 1

(a) 300-600 nm

(b) 400-700 nm

(c) 500-800 nm

(d) 600-900 nm

1-j. Intensity slicing is called_____(CO5) 1

(a) density slicing

(b) image slicing

(c) color slicing

(d) region slicing

2. Attempt all parts:-

2.a. Define the term " Boundary representation" in image.(CO1) 2

2.b. Define term Histogram stretching.(CO2) 2

2.c. Define the textural features of GLCM?(CO3) 2

2.d. Define term Point processing(CO4). 2

2.e. Discuss any two uses of RGB model.(CO5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. Discuss the following term: i) Adjancency ii) Connectivity iii) Neighbors of Pixels(CO1) 6

3-b. Define image digitizer? Write down the characterstics of an image digitizer.(CO1) 6

3-c. Write detail note about i) Spatial domain enhancement ii) Frequency domain enhancement(CO2) 6

3-d. Differntiate between Histogram Specification and Equalization(CO2) 6

3.e. Differentiate between Hough transform and GLCM .(CO3) 6

3.f. Discuss the advantages and disadvantages of mapping models(CO4). 6

3.g. Differentiate between Image enhancement and Segmentation.(CO5) 6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a. Discuss how image processing helps in different areas of medical science and also discuss the Electromagnetic spectrum.(CO1) 10

4-b.	Enlist various fundamental step in DIP with a neat block diagram.(CO1)	10

5. Answer any <u>one</u> of the following:-

5-a.	Describe short note on various types of noise.(CO2)	10
5-b.	Explain about following: 1)Contrast Stretching 2)Bit extraction(CO2)	10

6. Answer any <u>one</u> of the following:-

6-a.	Explain Skeletonization in image processing and why is it important?(CO3)	10
6-b.	Discuss how Region growing is related to Region split and merge techniques in image processing?(CO3)	10

7. Answer any <u>one</u> of the following:-

7-a.	Differentiate between the monomodal and multimodal registration.(CO4)	10
7-b.	Discuss the following : 1)Similarity Metrics 2) Cross Correlations(CO4).	10

8. Answer any <u>one</u> of the following:-

8-a.	Discuss the three commonly used segmentation techniques.(CO5)	10
8-b.	Explain the term: 1) Boundary extraction II) Extraction of connected components III) Convex hull IV)Thinning VI) Thickening VII) Skeletons VIII) Pruning (CO5)	10