Printed Page:- Subject Code:- AMTCSE0213

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: II - THEORY EXAMINATION (2023 - 2024)

Subject: Digital Image Processing

Time: 3 Hours Max. Marks: 70

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 15

1. Attempt all parts:-

1-a. Black colour in image represented by…(CO1) 1

(a) 1
(b) 0
(c) 256
(d) 259

1-b. What is the smallest possible value of the gradient image? (CO2) 1

(a) 1
(b) 0
(c) e
(d) -e

1-c. Frequency selectivity characteristics of DFT refers to(CO3) 1

(a) Ability to resolve different frequency components from input signal
(b) Ability to translate into frequency domain
(c) Ability to convert into discrete signal
(d) None of the above

1-d. Erosion is referred to as(CO4) 1

(a) reflection
(b) compression
(c) filtering
(d) decompression

1-e. Compressed image can be recovered back by(CO5) 1

(a) image enhancement
(b) image decompression

(c) image contrast

(d) image equalization

2. Attempt all parts:-

2.a.	What do you mean by Gray level?(CO1)	2
2.b.	Write the objectives of image enhancement technique.(CO2)	2
2.c.	Give the Properties of One-dimensional DFT? (CO3)	2
2.d.	Give the properties of the second derivative around an edge. (CO4)	2
2.e.	What are two main types of Data compression?(CO5)	2

SECTION B **20**

3. Answer any five of the following:-

3-a.	Explain the concept of convolution and correlation.(CO1)	4
3-b.	Explain the concept of image Acquisition(CO1)	4
3-c.	Discuss the image smoothing filter with its model in the spatial domain. (CO2)	4
3-d.	Specify the properties of 2D fourier transform.(CO2)	4
3.e.	Explain K-L transform with example.(CO3)	4
3.f.	Explain hit and miss transform in digital image processing ? (CO4)	4
3.g.	Describe the process of Converting colors from HSI to RGB(CO5)	4

SECTION C **35**

4. Answer any one of the following:-

4-a.	Explain the concept of sampling and Quantization. Also explain the importance of digitization in the digital image processing? (CO1)	7
4-b.	Summarize the application of digital image processing in society. (CO1)	7

5. Answer any one of the following:-

5-a.	Explain the steps involved in frequency domain filtering.(CO2)	7
5-b.	Write the difference between Box Filter and weighted average filter. Explain their use in image enhancement.(CO2)	7

6. Answer any one of the following:-

6-a.	Explain the Properties of 2D discrete Fourier Transform(CO3)	7
6-b.	Discuss in detail all the applications of transform.(CO3)	7

7. Answer any one of the following:-

7-a.	Discuss region oriented segmentation in detail(CO4)	7
7-b.	What is dilation and erosion. Write the Properties of dilation and erosion? (CO4)	7

8. Answer any one of the following:-

8-a.	Define Compression and explain data Redundancy in image compression.(CO5)	7
8-b.	Explain the Coding phase in JPEG.(CO5)	7