PAPER ID-421404

Subject Code: MTCS052

Roll No: | | | | | | | | | | | | | |

MTECH
(SEM II) THEORY EXAMINATION 2021-22
DIGITAL IMAGE PROCESSING

Time: 3 Hours ***Total Marks: 70***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2x7 = 14**

Qno.	Question	Marks	CO
a.	Define digital image processing and its applications.	2	1
b.	Differentiate between Weiner and Inverse Filter.	2	2
c.	Discuss bit plane slicing.	2	2
d.	What is the use of closing operation?	2	3
e.	Discuss region growing approach to image segmentation.	2	3
f.	Explain the CMY model.	2	4
g.	Discuss DCT and DFT transform of the image.	2	5

SECTION B

2. Attempt any *three* of the following: **7x3 = 21**

Qno.	Question	Marks	CO
a.	Let V={0,1}. Compute the De, D4, D8 distances between two pixels p and q. Let the pixel coordinates of p and q be (3,0) and (2,3) respectively, for the image shown below: **0 1 1 1** **1 0 0 1** **1 1 1 1** **1 1 1 1**	7	1
b.	What is histogram? An image is represented by the following frequency table of gray levels Gray Level: 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 Frequency: 1000 | 800 | 300 | 200 | 100 | 100 | 0 | 0 Obtain the frequency table of the equalized histogram.	7	2
c.	Explain the erosion and dilation process in detail.	7	3
d.	What is Image compression? Why do we need it? Explain various types of it.	7	4
e.	Why Image transformations are required? Explain various types of Image transformations in detail.	7	5

SECTION C

3. Attempt any *one* part of the following: **7x1 = 7**

Qno.	Questions	Marks	CO
a.	Explain different stages of image processing with its block diagram.	7	1
b.	Describes averaging filtering in the spatial domain. Also, discuss order static filters. How the noise gets reduced by using averaging filters.	7	1

4. Attempt any *one* part of the following: **7x1 = 7**

Qno.	Questions	Marks	CO
a.	Discuss various Intensity level slicing techniques. Perform the grey level slicing on a 3 BPP image with and without background for the following image. Consider r1=3, r2=5. 2 1 2 2 1 2 3 4 5 2 6 2 7 6 0 3 6 5 4 2 1 2 5 3 7	7	2
b.	Explain various grey level transformation functions in detail.	7	2

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5. **Attempt any *one* part of the following:** **7x1 = 7**

Qno.	Questions	Marks	CO
a.	Prove that Opening and closing are Dual Transformation. (1) Given an image A and Structuring element B (1) (1) A 0 0 0 0 0 0 0 0 1 1 0 0 0 1 1 1 1 0 0 0 1 1 0 0 0 0 0 0 0 0 B Compute: (i) A Eroded by B (ii)A^c Dilated by B	7	3
b.	Describe the following techniques: (i) Line Detection (ii) Edge Detection	7	3

6. **Attempt any *one* part of the following:** **7x1 = 7**

Qno.	Questions	Marks	CO
a.	Explain Huffman Coding with the help of an example in detail. Why Huffman code is called variable-length code?	7	4
b.	Describe various color models used in DIP.	7	4

7. **Attempt any *one* part of the following:** **7x1 = 7**

Qno.	Questions	Marks	CO
a.	Describe Various Object Descriptors in detail.	7	5
b.	What is Chain Code? Explain with the help of an example. What are the problems in Chain code and how these can be removed?	7	5