FIRST SEMESTER

END SEMESTER EXAMINATION

Supplementary Examination

M.Tech. (ISY)

FEBRUARY-2019

IT-552 DIGITAL IMAGE PROCESSING & ANALYSIS

Time: 3 Hours

Max. Marks: 100

Note: Answer any **FIVE** questions.

Assume suitable missing data, if any.

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Question No. 1

[10x2=20]

[a] Consider an image of size 512×512. If this image is transmitted to a channel of 20Mbps. Determine the transmission time required to transmit the following images:

[a] The original image is converted into a grayscale image of size half of the original image.

[b] Grayscale image is converted into a binary image of size half of the grayscale image.

Question No. 2

[10x2=20]

[a] Consider an image $f(m,n)$ and sample template$[XY]$. Image $f(m,n)$ is as defined:

$$f(m,n) = \begin{bmatrix} 1 & 1 & 2 & 2 \\ 1 & 1 & 3 & 3 \\ 1 & 1 & 3 & 3 \\ 2 & 2 & 2 & 1 \end{bmatrix}.$$ Determine the Gray Label Co-occurrence Matrix (GLCM) of an Image $f(m,n)$.

[b] What are unitary transform? Determine the 2D-DFT of the 4×4 gray scale image given below:

$$f[m,n] = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix}$$

Question No.3

[20]

Explain the Histogram equalization and perform the histogram matching operation on the 8×8 image with the following histogram:

Grey levels (r_k)	0	1	2	3	4	5	6	7
No. of pixels	8	10	10	2	12	16	4	2

The target histogram of the image:

Grey levels (r_k)	0	1	2	3	4	5	6	7
No. of pixels	0	0	0	0	20	20	16	8

Question No.4

[10x2=20]

[a] Compute the median value of the marked pixels in image shown below using a 3×3 Mask:

18	22	33	25	32	24
34	128	24	172	26	23
22	19	32	31	28	26

[b] What are the various steps involved in frequency domain filtering?

Question No.5

[10x2=20]

Consider a digital image $f(x,y) = \begin{bmatrix} 1 & 7 & 3 \\ 5 & 2 & 4 \\ 1 & 2 & 3 \end{bmatrix}$, in this image the last bit plane is removed and perform the followings:

[a] Represent the image after removing the plane.

[b] Compare the original histogram of image with histogram of removed plane image.

Question No.6

[10x2=20]

Write the short notes on any TWO of the followings:

[a] Image formation model

[b] Contrast stretching

[c] Image restoration model

[d] Dilation & Erosion