JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS-2022

B.Tech-VIII Semester (CS/IT/Civil/BT)

COURSE CODE (CREDITS): 21B1WEC731 (3) MAX. MARKS: 35

COURSE NAME: Digital Image Processing using Python

COURSE INSTRUCTOR: Dr. Nishant Jain MAX. TIME: 2 Hour

Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

For all the questions image, I1 and I2 are referred to the following images:

I1=

240	50	55	50	60
70	90	50	250	40
40	60	60	60	70
60	0	60	50	40
50	40	60	50	50

I2=

50	50	50	50	50
10	10	10	10	10
50	50	50	50	50
10	10	10	10	10
50	50	50	50	50

Q1. Considering the image I1 above:

a. Determine the type of noise present in the image.
b. Apply the filter that can best be used to remove the noise from the image.
c. Draw the normalized histogram of the image.
d. Determine with reason if the contrast of the image can be increased? (Yes/No).
e. If the answer to part (d) is yes, then mention how the contrast can be increased and obtain the image with increased contrast.

[1+3+2+2+2=10] CO3

Q2. Write the filter mask/ window/template for the following filters (assume size of the filter as 3X3):

a. Average Filter b. Laplacian Filter c. Sobel Filter

[1+1+1=3] CO2

Q3. State in brief the basic concept used in the following methods with respect to image processing:

a. Image Enhancement
b. Edge Detection
c. Image Segmentation
d. Feature Extraction

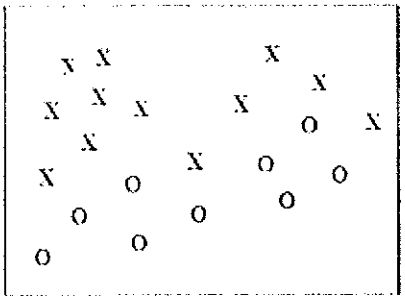
[2X4 =8] CO2

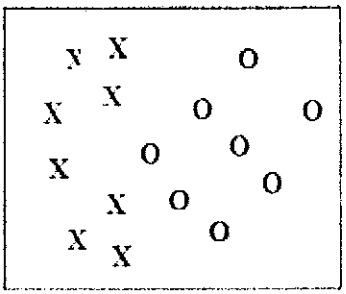
Q4. Considering image I2 (on page 1):

a. Determine the angle and the distance at which GLCM should be calculated.
b. Considering your answer in part (a), determine the normalized GLCM.
c. Evaluate ASM and contrast for the GLCM obtained in part (b)
d. Mention the significance of the values obtained in part (c) do determine the type of texture present in the image.

[2+3+2+2 = 9] CO3

Q5. In the following two cases determine if it is possible to classify between the two classes (represented as X and O respectively) using neurons. If yes, show classification boundaries.





[1+1=2] CO4

Q6. With respect to Artificial Neural Network, write a brief note on the following:

a. Supervised Learning
b. Unsupervised Learning
c. Learning Rate

[1X3 =3] CO4