

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech-VIII Semester (CSE/IT)

COURSE CODE(CREDITS): 21B1WEC731 (3)

MAX. MARKS: 35

COURSE NAME: Digital Image Processing using Python

COURSE INSTRUCTORS: Dr. Nishant Jain

MAX. TIME: 2 Hour

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(d) You need to write a Python code only if it is asked in the question.

Consider the following images A and B for the questions in which reference to images A and B is mentioned: (It is given that both the images are in **uint8** format)

A=

10	10	10	10	10
10	255	10	10	10
10	10	10	10	10
10	10	10	255	10
10	10	10	10	10

B=

120	120	60	60	60
120	120	60	60	60
120	120	60	60	60
120	120	60	60	60
120	120	60	60	60

Q1. Explain how the contrast can be increased from an image that is captured in low lighting.

[2]CO2

Q2. What do you understand with spatial resolution and Intensity resolution of an image?

[2]CO1

Q3. Considering the image, A, determine the following:

- Type of noise present in the image A.
- Resultant Matrix obtained on applying Average filter of size 3X3 on the image A.
- Resultant Matrix obtained on applying Median filter of size 3X3 on the image A.
- Compare the results obtained in part (b) and (c) and conclude out of the two filters used in part (b) and (c) which one is better for image A.
- Write a python code to apply an average filter on image A.

[1+2+2+2+2 = 9] CO2,CO3

Q4. Considering the image, A, determine the following:

- a. What do you understand by isolated points?
- b. Name the filter that can be used to identify the location of isolated points in image A.
Also write the template/mask of the filter.
- c. Determine the output matrix obtained in applying the filter on image A.
- d. Write a python code to apply the filter identified in part (b) on image A.

[2+2+2+2 = 8]CO2, CO3

Q5. For an image B, name and apply any filter that can detect the boundary between the two regions with pixel values 60 and 120 respectively. Determine the output matrix obtained.

[2+2 = 4]CO2

Q6. Considering the image, B, determine the following:

- e. Draw the histogram for an image B.
- f. What do you understand with image segmentation?
- g. Write an algorithm to segment the two regions in the image B.

[2+2+2 = 6]CO2

Q7. With respect to feature extraction techniques:

- a. Explain how feature extraction techniques can be used to classify different objects in the image?
- b. Explain how GLCM can be used to determine that the image (B) has vertical lines.

[2+2= 4]CO4