NORTHERN UNIVERSITY
BANGLADESH

Department of Computer Science & Engineering | **NI**

Final Term Examination, Fall 2021

Course Code: CSE 4351

Course Title: Image Processing and Computer Vision

Time: 1hour 50mins **Total Marks: 30**

Answer any three (03) questions.

1. (a) Define kernel. Discuss about the importance of size of kernel in spatial filtering. 3

(b) Suppose you are given the following image and kernel. Now apply the following filter over lower left corner and determine the output pixel. (i) Mean filter, (ii) Median filter, (iii) Max filter and (iv) Min filter. 5

40	20	52	35
28	30	65	45
25	20	30	60
15	10	00	15
30	12	20	20

1	1	1
1	1	1
1	1	1

(c) Explain boundary padding with proper example. 2

2. (a) Write down the difference between spatial kernel and morphological kernel. 3

(b) Using following image and kernels determine output of boundary extraction and connected-component extraction. 7

1	0	0	0	0	0	1
0	1	1	0	1	1	1
0	1	1	1	1	1	0
0	0	1	1	1	0	0
0	0	0	1	0	0	0
0	0	1	0	1	0	0
0	1	1	0	1	1	0

1	0	1
1	1	1
1	0	1

B1

$B2 = B1^C$

3. (a) Discuss the difference between Prewitt and Sobel Operator. 2

(b) Using Laplacian filter having boundary padded and negative mask enhance the following image. 5

50	60	70	30	40
80	10	90	50	20
20	10	70	90	40
30	90	50	60	20
10	30	40	60	70

(c) Define edge in an image. Explain the importance of histogram processing for efficient recognition. 3

4. (a) Explain Erosion and dilation. Design a kernel that erodes and dilates an image by 50% both in horizontal and vertical direction. 5

(b) Let think that you are given an image of 400x400 shown below. If you fold the image to the direction pointed below what will be the new location of the pixel (370, 280). 5