

Instructions: 1) All questions are compulsory.

2) Figures in rounded( ) brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.

3) CO is the index number of the Course Outcome statement.

4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.

5) Assume suitable data if necessary.

6) Use of non-programmable calculators is allowed

Marks COs BT  
Level

Q.1 Attempt the following

- A Apply the high pass filter on input image to make the image sharper. 6 CO2 3

**Input Image:**

```
[[10 10 10 10 10 10 10 10]
 [10 10 10 10 10 10 10 10]
 [10 10 50 50 50 50 10 10]
 [10 10 50 50 50 50 10 10]
 [10 10 50 50 50 50 10 10]
 [10 10 50 50 50 50 10 10]
 [10 10 10 10 10 10 10 10]
 [10 10 10 10 10 10 10 10]]
```

```
H = 0  -1  0
     -1  4  -1
      0  -1  0
```

- B List the applications of Morphological Image Processing(2). 6 CO1 2  
Explain one application in detail by using morphological image processing (4).

Q.2 Attempt the following

- A Analyze the following input image using specific technique with structuring element , so that the input image will become brighter. 6 CO3 4

3\*3 structuring Element

B= 1 1 1

1 1 1

1 1 1



Input image A =  
 0 0 0 0 0 0 0 0  
 0 0 1 1 1 1 0 0  
 0 0 1 1 1 1 0 0  
 0 0 1 1 1 1 0 0  
 0 0 1 1 1 1 0 0  
 0 0 1 1 1 1 0 0  
 0 0 0 0 0 0 1 0  
 0 0 0 0 0 0 0 0

OR

- A Analyze the following input image using specific technique with 6 CO3 4 structuring element, so that the input image will become darker.

Input image A =  
 0 0 0 0 0 0  
 0 0 1 1 0 0  
 0 1 1 1 1 1  
 0 0 1 1 0 0  
 0 0 0 0 0 0

Structuring Element

B = 1  
 1 1  
 1

- B Write Split and Merge algorithm (2). Convert the following image 7 CO3 4 into different segments using the same algorithm (4). Draw the Quadtree after splitting (1).

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 6 | 5 | 6 | 6 | 7 | 7 | 6 | 6 |
| 6 | 7 | 6 | 7 | 5 | 5 | 4 | 7 |
| 6 | 6 | 4 | 4 | 3 | 2 | 5 | 6 |
| 5 | 4 | 5 | 4 | 2 | 3 | 4 | 6 |
| 0 | 3 | 2 | 3 | 3 | 2 | 4 | 7 |
| 0 | 0 | 0 | 0 | 2 | 2 | 5 | 6 |
| 1 | 1 | 0 | 1 | 0 | 3 | 4 | 4 |
| 1 | 0 | 1 | 0 | 2 | 3 | 5 | 4 |

