B. Tech Odd Semester Examination, February, 2023

Computer Science & Engineering

(7th Semester)

Course No.: CSE-702

(Image Processing)

Full Marks: 50

Pass Marks: 15

Time: 2 hours

Note:
1. Attempt any five questions.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the right margin indicate full marks for the question.
6. All the mathematical symbols and abbreviations have their usual meanings.

1. Determine the convolution and correlation between the following images: 10

$$f(x,y) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} and g(x,y) = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

2. (a) Describe basic formulation for noise model. 4

   (b) Write notes on

   i) Mean filter

   ii) Median filter 2x3

3. (a) What are global, local and adaptive threshold? Discuss with example. 3*2

   (b) What are the three types of discontinuity in digital image? What is simultaneous contrast? 3+1

4. Define adjacency.What are 4-adjacency, 8-adjacency and m-adjacency? Explain with example(s) and the applications of the three adjacencies. 1+3x3

5. What is Image restoration? Draw and explain the basic block diagram of the restoration process. Give two areas where restoration process can be applied. 10

6. (a) Name and discuss 3 basic grey-level transformation functions with the diagram. 3x3

   (b) What is negative image? 1

7. Explain the principle of following region-based segmentation procedures:

   a) Region growing

   b) Region splitting

   c) Split and mergeAlso mention the difference between these approaches. 3*3+1

8. (a) What is sampling and quantization? Discuss with example. 3+3

   (b) What are grey-level slicing and bit-plane slicing? Discuss briefly. 2+2

****