Question Paper

Exam Date & Time: 08-May-2024 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SIXTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2024

DIGITAL IMAGE PROCESSING [CSE 4052]

Marks: 50 **Duration: 180 mins.**

E

Answer all the questions. Section Duration: 180 mins

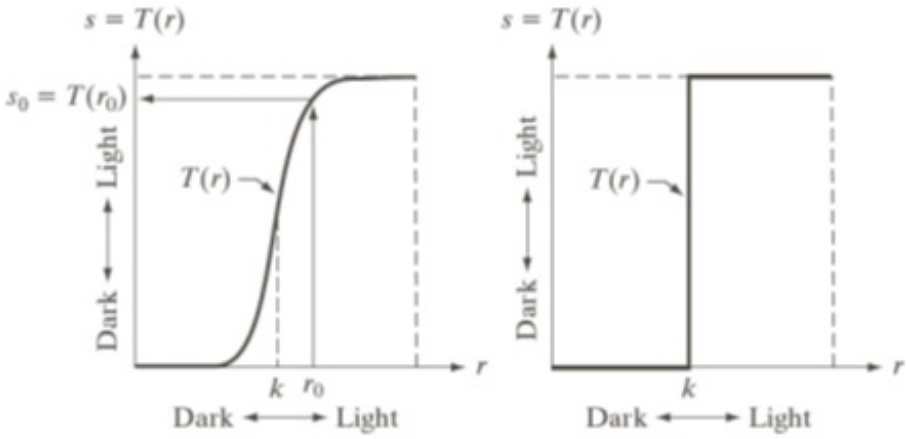
Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1) Distinguish between imaging, image preprocessing, post-processing, and image analyses (4)

A)

B) Explain the path and connectivity relationship in pixels relationship and write the appropriate symbols involved (4)

C) Interpret the following graphs of spatial domain (2)



2) Inspect the Fourier transform pairs, and interpret the equation (4)

A)

B) With a neat diagram of filter kernel and the terms associated, discuss the image smoothing using ideal low pass filter (4)

C) Make use of mathematical expression and write the equation to compute the magnitude and the phase angle in Fourier domain (2)

3) List the steps for filtering in the frequency domain. Why we add pow (-1, x,+y) to one of the steps? (4)

A)

B) Along with the equation, explain how the salt and pepper noise is computed and added to the (4)

image.

C) When Ps=0.02 and Pp=0.01, what is the value of noise density and explain how image is corrupted? (2)

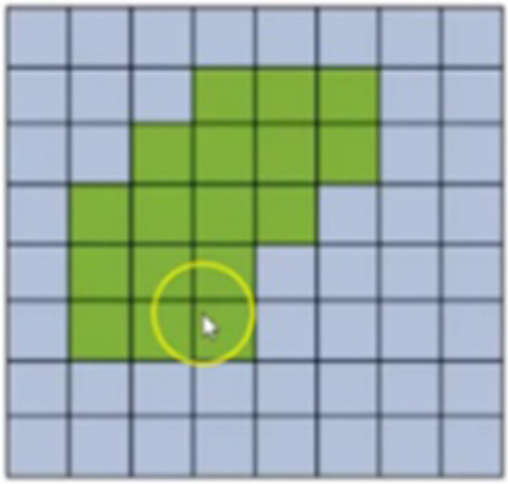
4) Along with a simple diagram, list all the set notations to represent the regions within in image I. (5)

A)

B) Construct the graph in 2D (front view) for the following filter kernel (2)

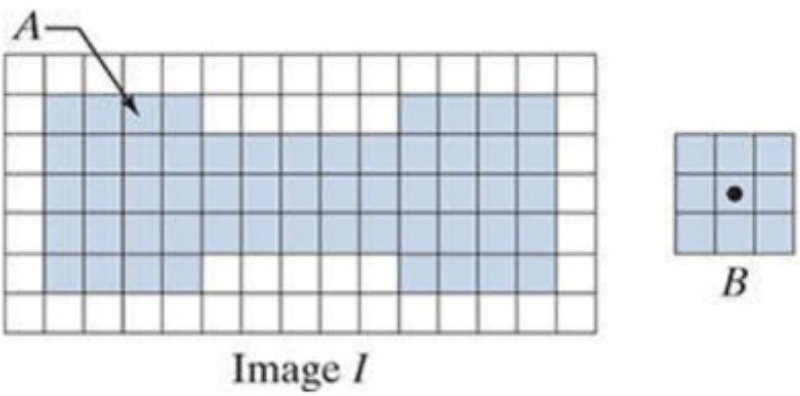
0	0	−1	0	0
0	−1	−2	−1	0
−1	−2	16	−2	−1
0	−1	−2	−1	0
0	0	−1	0	0

C) Differentiate between erosion and dilation with one key difference. Construct a dilated image for the following figure. (3)



5) Assess the output of erosion operator on the following image I with the structuring element B. (2)

A)



B) With the equations, explain the logic of opening and closing morphological operations (with a simple diagram) (6)

C) List at least 6 meaningful descriptions of an object on 2D plane (2)

-----End-----