

Question Paper

Exam Date & Time: 21-May-2022 (10:00 AM - 01:00 PM)



MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

SIXTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2022

DIGITAL IMAGE PROCESSING [CSE 4052]

Marks: 50

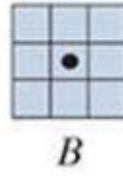
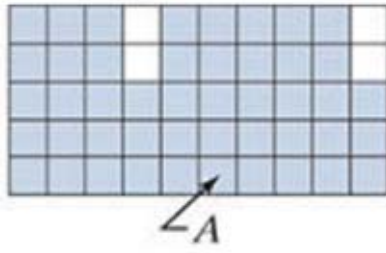
Duration: 180 mins.

Instructions to Candidates:

Answer ALL questions Missing data may be suitably assumed

- 1) Explain the mach band effect and the simultaneous contrast along with the diagram (4)
 - A)
 - B) Define 4-adjacency, 8-adjacency and m-adjacency of a pixel (4)
 - C) Write the mathematical expressions for 4-neighbors of p, 4 diagonal neighbours of p and 8 neighbours of p, where p is the pixel under consideration (2)
- 2) Explain sampling and quantization (4)
 - A)
 - B) Write the equations to compute Fourier Transform and its inverse for two variables (3)
 - C) Write the steps involved in frequency domain filtering (3)
- 3) In $g(x,y)=T[f(x,y)]$, the x-axis has the value from 0.255 and y-axis has 0.255. There is a line parallel to x-axis whose coordinate is (0,128) and (255,128). Write the diagram of this histogram. What is your interpretation on this graph? (4)
 - A)
 - B) What are the types of noise models? Give the relation for Gaussian noise and explain the terms (3)
 - C) Write the block diagram of image restoration and degradation process (3)
- 4) Write the edge detection masks for finding the edges in horizontal, vertical, +45 degree and -45 degree. Any valid values can be considered for the masks (4)
 - A)
 - B) Write the algorithm steps i.e. for computing Global thresholding? (4)
 - C) What are the typically performed steps in edge detection? (2)
- 5) Explain the erosion and dilation operator logic in morphological image processing (4)
 - A)
 - B) Explain the basic tool for shape detection in image processing (4)
 - C) In the following figure, for the foreground object (A), apply the given structuring element (B) and (2)

compute the boundary of A (just output is expected)



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