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**Presidency University**

**Bengaluru**

**School Of Computer Science and Engineering & Information Science**

**Summer Term End-Term Examinations, Aug 2024**

**Date** : 07/08/2024

**Time** : 9:30 AM to 12:30 PM

**Max Marks** : 100

**Weightage** : 50%

**Odd Semester** : 2023 - 24

**Course Code** : CSE3081

**Course Name** : Digital Image Processing

**Department :** Computer Science and Engineering

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

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| **Q.No** | **Questions** | **Marks** | **CO** | **RBT** |
| 1. | 1. Define an image, state the major categories of images, and provide examples for each category. | 4 | CO1 | L1 |
| 1. Explain the Electromagnetic spectrum with neat diagram in digital image processing and also give one applications of each spectrum | 6 | CO1 | L2 |
| 1. For a given 4X4 image perform histogram equalization and draw the histogram of the image before and after equalization.  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 2 | 2 | | 2 | 2 | 8 | 5 | 5 | | 5 | 1 | 1 | 1 | 1 | | 1 | 1 | 0 | 0 | 0 | | 10 | CO1 | L3 |
| OR | | | | |
| 2. | 1. Explain the process of image digitization and why it is important in real life. | 4 | CO1 | L1 |
| 1. Explain Image digitization with a neat diagram | 6 | CO1 | L2 |
| 1. For a given 4X4 image having grayscale between 0 - 8 perform histogram equalization and draw the histogram of image before and after equalization.  |  |  |  |  | | --- | --- | --- | --- | | 3 | 4 | 4 | 3 | | 5 | 3 | 5 | 4 | | 4 | 3 | 4 | 5 | | 3 | 5 | 3 | 5 | | 10 | CO1 | L3 |

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| 3. | 1. Define a digital image and explain the different types of digital images along with their number of channels. | 4 | CO2 | L1 |
| 1. Discuss the use of Spatial filter in the digital image processing with an example | 6 | CO2 | L2 |
| 1. Explain the concepts of spatial relationships between pixels in a digital image. How do adjacency, connectivity, and distance metrics contribute to image analysis? | 10 | CO2 | L3 |

OR

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| 4. | 1. Define image enhancement and give some applications of it. | 4 | CO2 | L1 |
| 1. Explain the process of restoring an image corrupted by periodic noise using frequency domain techniques. What are the key steps involved? | 6 | CO2 | L2 |
| 1. Explain the Min-Max Filters in detail with an example | 10 | CO2 | L3 |

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| 5. | 1. Compare and contrast image enhancement and image restoration in digital image processing. | 4 | CO2 | L1 |
| 1. List and describe four categories of noise in digital images. | 6 | CO2 | L2 |
| 1. Explain the Median Filters in detail with an example | 10 | CO2 | L3 |

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| 6 | 1. Explain advantages and disadvantages of digital images. | 4 | CO3 | L1 |
| 1. Explain the stages in edge detection. | 6 | CO3 | L2 |
| 1. Explain Mean filters in detail with an example | 10 | CO3 | L3 |

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| 7. | 1. Define a histogram and explain the concept of histogram equalization. Why is histogram equalization important in digital image processing | 4 | CO3 | L1 |
| 1. Explain the four categories of edge detection algorithms in DIP. | 6 | CO3 | L2 |
| 1. Briefly explain low pass filters for smoothing in frequency domain. | 10 | CO3 | L3 |

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| 8. | 1. Briefly explain gray level slicing piecewise linear transformation in digital image processing. | 4 | CO3 | L1 |
| 1. Explain the steps of global thresholding algorithm in digital image processing in detail. | 6 | CO3 | L2 |
| 1. With a diagram, explain some basic gray level transformation functions. | 10 | CO3 | L3 |

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| 9. | 1. Explain the image negative transformation in digital image processing, including the relevant formula and its applications. | 4 | CO3 | L1 |
| 1. Explain HIS color model in digital image processing with neat geometrical representation of it. | 6 | CO3 | L2 |
| 1. Explain the fundamental steps in Digital Image Processing with a neat block diagram | 10 | CO3 | L3 |

OR

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| 10. | 1. Explain the major digital image filtering domains. | 4 | CO3 | L1 |
| 1. Explain RGB color model in digital image processing with neat geometrical representation of it. | 6 | CO3 | L2 |
| 1. Describe the concept of homomorphic filtering and its application in image enhancement. How does homomorphic filtering address the problem of illumination and reflectance variations in an image? Provide a detailed explanation of the process. | 10 | CO3 | L3 |

**\*\*\*\*ALL THE BEST\*\*\*\***