**20EI703/PE**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular) DEGREE EXAMINATION** | | | | |
| **January, 2024** | | **Electronics and Instrumentation Engineering** | | |
| **Seventh Semester** | **Digital Image Processing** | | | |
| **Time:** Three Hours | | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | | **(4X14=56 Marks)** |
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|  |  |  | | | CO | BL | M |
| 1 | a) | | | Specify the basic components of image processing system. | CO 1 | L2 | 1M |
|  | b) | | | Differentiate brightness and contrast | CO 1 | L2 | 1M |
|  | c) | | | What do you mean by image acquisition | CO 1 | L2 | 1M |
|  | d) | | | What is selective filtering? | CO 2 | L2 | 1M |
|  | e) | | | Write expression for Gray, Log and Gamma transformations | CO 2 | L2 | 1M |
|  | f) | | | Specify the need for image enhancement. | CO 2 | L2 | 1M |
|  | g) | | | What is meant by Image Restoration? | CO 2 | L2 | 1M |
|  | h) | | | Define Gray-level interpolation? | CO 3 | L2 | 1M |
|  | i) | | | What is the role of noise in image thresholding? | CO 3 | L2 | 1M |
|  | j) | | | Draw the block diagram of general image compression system. | CO 3 | L2 | 1M |
|  | k) | | | What are two main types of Data compression? | CO 3 | L2 | 1M |
|  | l) | | | What are the three types of discontinuity in digital image? | CO 4 | L2 | 1M |
|  | m) | | | Give the properties of the second derivative around an edge? | CO 4 | L2 | 1M |
|  | n) | | | Define Erosion and Dilation | CO 4 | L2 | 1M |
| **Unit-I** | | | | | | | |
| 2 | a) | | | In detail explain the fundamental steps involved in digital image processing systems. | CO 1 | L2 | 7M |
|  | b) | | | Explain the various distance measures used in image processing. | CO 1 | L3 | 7M |
| **(OR)** | | | | | | | |
| 3 | a) | | | Explain about Walsh transform, and find 1D Walsh basis function for fourth order system. | CO 1 | L3 | 7M |
|  | b) | | | Prove the following properties of 2D-DFT: (i) Translation and Rotation (ii) Periodicity | CO 1 | L3 | 7M |
| **Unit-II** | | | | | | | |
| 4 | a) | | | Explain about Image sharpening using second order derivative operator | CO 2 | L3 | 7M |
|  | b) | | | Explain briefly about Histogram Equalization and Specification. | CO 2 | L2 | 7M |
| **(OR)** | | | | | | | |
| 5 | a) | | | Discuss about image smoothing in the frequency domain using ideal low pass filters. | CO 2 | L2 | 7M |
|  | b) | | | Compare the various filters available under frequency domain for image enhancement | CO 2 | L3 | 7M |
| **Unit-III** | | | | | | | |
| 6 | a) | | | Discuss about image denoising using spatial mean filters | CO 3 | L3 | 7M |
|  | b) | | | What is image restoration? Explain the degradation model for continuous function in detail. | CO 3 | L3 | 7M |
| **(OR)** | | | | | | | |
| 7 | a) | | | What is data redundancy? Explain three basic data redundancy? | CO 3 | L2 | 7M |
|  | b) | | | Explain the Huffman coding with example. | CO 3 | L2 | 7M |
| **Unit-IV** | | | | | | | |
| 8 | | | Discuss about region-based image segmentation techniques. Compare threshold region-based techniques. Define and explain the various representation approaches? | | CO 4 | L3 | 14M |
| **(OR)** | | | | | | | |
| 9 | a) | | | Explain Boundary descriptors in detail with a neat diagram. | CO 4 | L2 | 7M |
|  | b) | | | Discuss briefly about morphological smoothing and morphological gradient. | CO 4 | L2 | 7M |

