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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 08 / 01/ 2025 **Time:** 09:30 am –12:30 pm |

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| **School:** SOCSE | **Program:** B.Tech ISE/ISR/ISB | |
| **Course Code:** CSE3071 | **Course Name:** Computer Vision | |
| **Semester**: V | **Max Marks**:100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **38** | **36** | **62** | **44** |  |

**Instructions:**

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

**Part A**

|  |  |  |  |  |
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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Define edge detection. | **2 Marks** | **L1** | **CO2** |
| **2** | List two types of noise in digital images. | **2 Marks** | **L1** | **CO1** |
| **3** | Define aliasing. | **2 Marks** | **L1** | **CO1** |
| **4** | Define segmentation in image processing. | **2 Marks** | **L1** | **CO2** |
| **5** | Explain aliasing | **2 Marks** | **L2** | **CO1** |
| **6** | List two image compression techniques. | **2 Marks** | **L1** | **CO2** |
| **7** | Explain the concept of spatial domain filtering | **2 Marks** | **L2** | **CO3** |
| **8** | List the advantages of using morphological operations. | **2 Marks** | **L1** | **CO4** |
| **9** | List the applications of image processing. | **2 Marks** | **L1** | **CO1** |
| **10** | Explain the necessity of feature extraction. | **2 Marks** | **L2** | **CO4** |

**Part B**

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| **Answer the Questions Total 80 Marks.** | | | | | |
| **11.** | **a.** | Explain the role of lighting in image. | **10 Marks** | **L2** | **CO1** |
| **b.** | **Given Data:** 3x3 Image Matrix:    Gaussian Kernel:    Apply the Gaussian filter for noise reduction. | **10 Marks** | **L3** | **CO2** |
| **Or** | | | | | |
| **12.** | **a.** | Explain the importance of Computer vision in healthcare industry. | **10 Marks** | **L2** | **CO3** |
| **b.** | Track the position of a moving car starting at (x=2,v=1)(x=2, v=1)(x=2,v=1). Use the Kalman Filter to predict its position after 1 second, considering the following equations:   1. **State Prediction:**   xk+1=xk+vk⋅Δt   1. **Measurement Update:**   xk+1∣k=xk+vk⋅Δt=2+1×1=3 | **10 Marks** | **L3** | **CO4** |
| **s** |  |  |  |  |  |
| **13.** | **a.** | Compare different machine learning models for image classification | **10 Marks** | **L2** | **CO1** |
| **b.** | Given Data:    Apply PCA for feature extraction | **10 Marks** | **L3** | **CO3** |
| **Or** | | | | | |
| **14.** | **a.** | Explain the commands in MATLAB to do the various operators used in image processing. | **10 Marks** | **L1** | **CO4** |
| **b.** | Data: (2,4,6,8)(2, 4, 6, 8)(2,4,6,8) Initial Means: μ1=3,μ2=7  Apply EM algorithm to cluster two Gaussians. | **10 Marks** | **L3** | **CO4** |

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| **15.** | **a.** | Implement a program in MATLAB to do the edge detection on a given image. | **10 Marks** | **L2** | **CO1** |
| **b.** | Perform **connected component labeling** on the binary image: | **10 Marks** | **L3** | **CO2** |
| **Or** | | | | | |
| **16.** | **a.** | Explain different types of linear filters. | **10 Marks** | **L2** | **CO3** |
| **b.** | Perform **template matching** for a 3x3 image and a 2x2 template: | **10 Marks** | **L3** | **CO2** |

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| **17.** | **a.** | Explain different types of color models. | **10 Marks** | **L2** | **CO3** |
| **b.** | Detect a line in a binary edge-detected image using the **Hough Transform**: | **10 Marks** | **L3** | **CO4** |
| **Or** | | | | | |
| **18.** | **a.** | Explain the process of texture-based classification. | **10 Marks** | **L2** | **CO3** |
| **b.** | Perform **dilation** and **erosion** on a binary image:    Structuring Element: | **10 Marks** | **L3** | **CO3** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***