Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **14EC3071** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DIGITAL IMAGE PROCESSING** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Discuss the significance of digital image processing in various fields of application. | CO2 | 10 |
| b. | Describe the following properties of 2D DFT (i) separability (ii) translation (iii) periodicity (iv) conjugate symmetry and (v) rotation | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Describe the fundamental steps of digital image processing involved in extracting the pin code written on a letter card. | CO1 | 10 |
| b. | Discuss the significance of 2D DCT. | CO1 | 6 |
| c. | Justify the dimensional complexity of digital images. | CO3 | 4 |
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| 3. | a. | Analyze how the images are enhanced using the following techniques: power-law transformation, gray level slicing, Gamma correction and inverse log. | CO3 | 10 |
| b. | Examine the ringing effect occurs in frequency domain filters. | CO3 | 10 |
| **(OR)** | | | | |
| 4. | a. | Examine the performance of inverse filter towards image restoration. | CO1 | 10 |
| b. | Examine the probability density functions of noises. | CO3 | 6 |
| c. | Analyze the usage of harmonic and contraharmonic filters. | CO1 | 4 |
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| 5. | a. | Describe the following color models: RGB, HSI and CMY. | CO1 | 12 |
| b. | Compare and contrast the basic morphological operators. | CO1 | 8 |
| **(OR)** | | | | |
| 6. | a. | Explain the morphological algorithms for boundary extraction and region filling. | CO1 | 10 |
| b. | Discuss how shapes in biomedical images can be detected using Hit-or-Miss transform. | CO2 | 10 |
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| 7. | a. | Describe the edge detection procedure in images. | CO1 | 8 |
| b. | Show the masks for Roberts, Prewitt, Sobel and Canny edge operators. | CO1 | 12 |
| **(OR)** | | | | |
| 8. | a. | Discuss the role of illumination on thresholding and how to overcome non uniform illumination towards image segmentation. | CO3 | 10 |
| b. | Write briefly the basic formulation of region based segmentation. | CO1 | 6 |
| c. | Write the procedure for region growing based image segmentation. | CO1 | 4 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Describe the application of Laplacian operator in image sharpening. | CO1 | 12 |
| b. | Discuss about water-shed segmentation. | CO1 | 8 |