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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May – 2017**

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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. | How will you improve the contrast of the images using spatial domain sharpening filters? Also, explain the steps involved in Laplacian filtering process. | CO1 | 5 |
| b. | What is the storage space required to store an 8 bit level grey image with dimension 256×512? What is the need for image compression? | CO1 | 15 |
| (OR) | | | | |
| 2. | a. | Explain in detail the various grey level transforms available for digital images. | CO1 | 5 |
| b. | |  |  |  | | --- | --- | --- | | 4 | 7 | 35 | | 1 | 8 | 2 | | 45 | 34 | 5 |   Image window 3 x 3 mask   |  |  |  | | --- | --- | --- | | 1 | 1 | 1 | | 2 | 2 | 2 | | -1 | -1 | -1 |   Calculate the response (R) for the centre pixel of the image using the given mask using the averaging technique. | CO1 | 15 |
| 3. | a. | With necessary mathematical steps, illustrate the methodology of homomorphic filtering in digital images. | CO2 | 5 |
|  | b. | Comment briefly on the various color models available for image processing. | CO2 | 15 |
| (OR) | | | | |
| 4. | a. | How will you perform image sharpening using frequency domain filters? Support your answer with necessary mathematical equations. | CO2 | 5 |
|  | b. | Differentiate hue, saturation and intensity. | CO2 | 15 |
| 5. | a. | With mathematical expressions, explain the process of weiner filtering in digital images. | CO3 | 5 |
|  | b. | Explain the following morphological operators in detail:   1. Erosion, (b) Dilation, (c) Opening, (d) Region filling and   (e) Thickening | CO3 | 15 |
| (OR) | | | | |
| 6. | a. | What do you mean by mean filter? How can you use the different types of mean filters for image restoration? | CO3 | 5 |
|  | b. | Explain the inverse filtering process for restoring the original image from the noise corrupted image. | CO3 | 15 |
| 7. | a. | Comment briefly on the various thresholding concepts used in digital image processing techniques. | CO3 | 5 |
|  | b. | How will you perform edge linking and boundary extraction in digital images? | CO3 | 15 |
| (OR) | | | | |
| 8. | a. | What do you mean by order statistics filters? How can you use these filters for image restoration? | CO3 | 5 |
|  | b. | Comment briefly on the various thresholding concepts used in digital image processing techniques. | CO3 | 15 |
|  | | **Compulsory**: |  |  |
| 9. | a. | What are the derivative operators useful in image segmentation? Explain their role in segmentation. | CO3 | 10 |
|  | b. | Explain in detail the threshold selection based on boundary conditions. | CO3 | 10 |

ALL THE BEST