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



**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **15EI2013** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MEDICAL IMAGE COMPUTING** | **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. | Examine the histogram for various levels of image contrast. Illustrate how you use histogram equalization to obtain better contrast. | CO3 | 10 |
| b. | Investigate the underline theme behind the following visual phenomena: i. Mach-band effect and ii. simultaneous contrast and iii. optical illusion. | CO2 | 10 |
| (OR) | | | | |
| 2. | a. | Construct the two dimensional Laplacian filter and suggest the basic way to use it for image enhancement. Comment on the result of Laplacian filter. | CO1 | 10 |
| b. | Compare and contrast point and neighbourhood processing. | CO3 | 3 |
| c. | Examine the procedure and masks used for edge detection using Sobel operator. | CO3 | 7 |
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| 3. | a. | With neat diagram brief the model of image degradation / restoration process. | CO1 | 3 |
|  | b. | Investigate the underlying theme to estimate the degradation function based on observation, experimentation and mathematical modeling. | CO1 | 10 |
|  | c. | Analyse inverse filter for image restoration. Compare with pseudo-inverse filter. | CO3 | 7 |
| (OR) | | | | |
| 4. | a. | Describe how least mean square filtering can handle noise better than inverse filtering. | CO1 | 10 |
|  | b. | Discuss briefly on blind image restoration. | CO3 | 4 |
|  | c. | Show the probability density function of Gaussian and Gamma noises. | CO1 | 6 |
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| 5. | a. | Illustrate how image compression can be achieved using Huffman coding. | CO2 | 8 |
|  | b. | Put forth the compression strategy in Delta modulation and give the reasons for resulting blurred object edges and grainy noise surfaces. | CO3 | 12 |
| (OR) | | | | |
| 6. | a. | For the following data P(a1) = 0.2, P(a2) = 0.2, P(a3) = 0.4, P(a4) = 0.2 find the encoded output using arithmetic coding. | CO2 | 8 |
|  | b. | Illustrate the procedure of JPEG compression standard. | CO3 | 12 |
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| 7. | a. | Brief the types of thresholding. Write the algorithm for global thresholding. | CO3 | 10 |
|  | b. | Describe the following process to achieve better image segmentation: i. region growing and ii. region splitting and merging. | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | Discuss on Chain codes features. Compute the first difference of the code 0101030303323232212111. | CO2 | 8 |
|  | b. | Describe the various boundary descriptors or features. | CO2 | 12 |
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|  | | **Compulsory:** |  |  |
| 9. | a. | Explain in detail the following properties of 2D Discrete Fourier Transform in terms of better image analysis: i. separability ii. translation iii. rotation iv. periodicity and v. conjugate symmetry | CO3 | 10 |
|  | b. | Analyse how simultaneous dynamic range compression and contrast enhancement is achieved in Homomorphic filtering approach for image enhancement? | CO1 | 10 |

ALL THE BEST