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 – Nov/Dec – 2017**

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| **Code :** | **14EC2056** | **Duration :** | **3hrs** |
| **Sub. Name :** | **WAVELET TECHNIQUES** | **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 principle of representing unknown signals by known set of signals and list out the advantages of orthogonal set of functions for signal analysis. | CO1 | 14 |
| b. | Inspect the concept of scale and its relation with frequency. | CO1 | 6 |
| (OR) | | | | |
| 2. | a. | Compare the Fourier, windowed Fourier and wavelet analysis. Also plot the geometrical viewpoint of Shannon, Fourier and Gabor analysis. | CO1 | 14 |
| b. | Discuss clearly the features of wavelet transform and hence distinguish between continuous and discrete wavelet transforms. | CO1 | 6 |
|  |  |  |  |
| 3. | a. | Construct the analysis procedure of wavelet with suitable diagram. | CO1 | 16 |
|  | b. | Write the expression for discrete wavelet transform. | CO1 | 4 |
| (OR) | | | | |
| 4. | a. | Prove the orthogonality between the two basis functions Φ(t) and Ψ(t) for Case (i) if both basis function overlap and Case (ii) if both bases function do not overlap. | CO2 | 16 |
|  | b. | State the significance of mother wavelet or analyzing wavelet. | CO2 | 4 |
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| 5. | a. | Explain the signal reconstruction procedure of wavelet with respect to filter banks. | CO2 | 16 |
|  | b. | Bring out the needs for wavelet and necessity of wavelet basis. | CO2 | 4 |
| (OR) | | | | |
| 6. | a. | Explain clearly the concept of basis for wavelet subspace using Haar wavelet. | CO2 | 14 |
|  | b. | Discuss the relationship between filter banks and wavelet basis. | CO2 | 6 |
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| 7. | a. | Elaborate the need for scaling function in Multi Resolution Analysis. | CO3 | 10 |
|  | b. | Illustrate your understanding on perfectly matching filters and QMF. | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | Describe in detail about the alias free QMF filter bank. | CO3 | 10 |
|  | b. | What do you understand by biorthogonal filters and discuss the implementation of B- spline filter. | CO3 | 10 |
|  |  |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Design a signal that is well approximated in best local cosine basis but requires many more vectors to approximate it efficiently in a best wavelet packet basis. | CO3 | 12 |
|  | b. | Discuss clearly about nonseparable multidimensional wavelet. | CO3 | 8 |

ALL THE BEST