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 :** | **14EC2014** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DIGITAL SIGNAL 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. | Findfor the input sequence and impulse response using overlap save method | CO1 | 20 |
| (OR) | | | | |
| 2. | a. | Compute 8 point DFT of a sequence using radix-2 DIT-FFT algorithm. | CO1 | 16 |
| b. | Determine the DFT of the sequence x(n) = (-1)n  for N = 4 | CO1 | 4 |
| 3. | a. | Find the response of an LTI system with impulse response  h(n)={-4,-4,-6} for input  x(n)={1, 2,3,4,5} using circular convolution | CO1 | 10 |
|  | b. | Find the circular convolution of x(n)={1,2,3,4} with h(n)={1,1,2,2} | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | An 8-point sequence is given by. Compute the 8 point DIT FFT of x (n). Draw the flow graph and tabulate the intermediate stage results. | CO1 | 20 |
| 5. | a. | Design a Butterworth digital IIR filter using the impulse variance method for the followingspecifications:    Assume T=1 sec. | CO2 | 16 |
|  | b. | **What is many to one mapping? Explain in detail** | CO2 | 4 |
| (OR) | | | | |
| 6. | a. | Design a digital Butterworth filter that satisfies the following constraints using bilinear transformation. Assume T=1 s. | CO2 | 16 |
|  | b. | **Give any two properties of Butterworth filter and Chebyshev type-I filter.** | CO2 | 4 |
| 7. | a. | Design an ideal lowpass filterwith the following frequency response using a Hanning window. Find the values of for N=11.  Find. | CO2 | 16 |
|  | b. | Draw the linear phase realization of  H(z) = ½ + 1/3 z-1 + z -2 + ¼ z-3  + z-4 + 1/3 z-5+ ½ z-6 | CO2 | 4 |
| (OR) | | | | |
| 8. | a. | Determine the filter coefficientsobtained by frequency sampling for N= 7. | CO2 | 16 |
|  | b. | **Define linear phase filter. Derive the condition to be satisfied by the impulse response in order to have a linear phase** | CO2 | 4 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the basic Wiener filter theory and discuss its limitations | CO3 | 10 |
|  | b. | Consider the LTI system governed by the equation y[n]+0.92y[n-1]+0.35y[n-2] = x[n-2].  Discuss the effect of co-efficient quantization on pole locations when the co-efficients are quantized using (i) 3 bits by truncation (ii) 4 bits by truncation. Comment on the results. | CO3 | 10 |

ALL THE BEST