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 – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **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. | Using the radix-2 DIF FFT algorithm, compute the 8 point DFT of the sequence. Draw the flow graph and show all the intermediate results. | CO1 | 16 |
| b. | **What are the differences and similarities between DIF and DIT algorithms?** | CO1 | 04 |
| **(OR)** | | | | |
| 2. | 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 |
| 3. | a. | Find for the sequences and using overlap save method. | CO1 | 16 |
| b. | Determine the DFT of the sequence for N=4. | CO1 | 04 |
| **(OR)** | | | | |
| 4. |  | Perform overlap add convolution for the given two input sequences and . Also verify your result with linear convolution method. | CO1 | 20 |
| 5. | a. | Design a digital Butterworth filter that satisfies the following constraints using bilinear transformation. Assume T=1 s. | CO2 | 16 |
| b. | Using impulse invariance method convert the following analog transfer function into digital with sampling period T= 0.2 second. | CO2 | 04 |
| **(OR)** | | | | |
| 6. |  | Design a Chebyshev filter for the following specifications using impulse invariance method. | CO2 | 20 |
| 7. | a. | Design a linear phase FIR digital filter for the given specifications using Hanning window of length M=7. | CO2 | 16 |
|  | b. | Obtain linear phase structure with minimum number of multipliers for the system described by the equation. | CO2 | 04 |
| **(OR)** | | | | |
| 8. |  | Design and implement a linear phase FIR filter of length N=15 by frequency sampling method which has the following unit sample sequence. | CO2 | 20 |
| **Compulsory:** | | |  |  |
| 9. | a. | Illustrate zero-input limit cycle oscillations with an example. | CO3 | 12 |
| b. | With neat block diagram explain the Harvard architecture. | CO3 | 04 |
| c. | Explain coefficient quantization effects in direct form realization of IIR filter. | CO3 | 04 |

ALL THE BEST