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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

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

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12MT213** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **Digital Signal Processing & Media Applications** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Write down the Linear convolution equation. | (1) |
| 2. | Define Discrete-time signal | (1) |
| 3. | Draw the magnitude response of a normalized low pass elliptic filter. | (1) |
| 4. | State any one difference between Chebychev filter and elliptic filter | (1) |
| 5. | Write the causal Blackman window formula. | (1) |
| 6. | What is the condition for linear-phase characteristics of an FIR filter? | (1) |
| 7. | What are the two types of quantization employed in digital system? | (1) |
| 8. | What is rounding? | (1) |
| 9. | What is replication? | (1) |
| 10. | Mention any two applications of DSP. | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | A discrete –time signal x (n) is defined as x (n) = {2, 3, 4, 5, 6}. Sketch the signal x (-n +4) | (3) |
| 12. | Draw the Direct form I structure for the system y(n) = 0.5 x(n) +0.9 y(n – 1) | (3) |
| 13. | 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- | (3) |
| 14. | Define relative error and tabulate the relative errors for floating point binary number. | (3) |
| 15. | Explain MAC D instruction. | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | a. | Find the output of the system whose input is  x(n) = 1 ; n = -2,0,1  = 2 ; n = -1  = 0 ; elsewhere  And impulse response is h(n) = δ(n) - δ(n -1) + δ(n-2) – δ(n - 3) | (8) |
|  | b. | What are the basic elements of a digital signal processing system? Explain. | (7) |
| (OR) | | | |
| 17. |  | Find the IDFT of a sequence X(k) = {5, 0, 1-j, 0, 1, 0, 1+j, 0} using DIT-FFT algorithm. | (15) |
| 18. |  | Design a digital Butterworth filter satisfying the constraints  0.707 ≤│H( ejω) │≤ 1 for 0 ≤ ω ≤ П/2  │H( ejω) │≤ 0.2 for 3П/4 ≤ ω ≤ П  Using Bilinear transformation method. | (15) |
| (OR) | | | |
| 19. |  | Realize the difference equation using Direct form I and II  Y(n) = - 0.1 y ( n – 1) + 0.72 y (n – 2) + 0.7 x(n) – 0.252 x(n – 2) | (15) |
| 20. |  | Design a Nine tap linear phase filter having ideal response  Hd ( ejω) = 1 ; - П/6 ≤│ ω │ ≤ П/6  = 0 ; П/6 ≤│ ω │ ≤ П/3  = 1 ; П/3 ≤│ ω │ ≤ П  Use Rectangular window. | (15) |
| (OR) | | | |
| 21. |  | Using frequency sampling method, design a bandpass filter with the following specifications. Sampling frequency=8000 Hz,fc1 = 1000 Hz fc2 = 3000 Hz. Determine filter coefficients for N=7. | (15) |
| 22. |  | Explain |  |
| a. | ADC quantization noise. | (5) |
| b. | Co-efficient quantization error. | (5) |
| c. | Product quantization error. | (5) |
| (OR) | | | |
| 23. |  | Discuss in detail about the representation of numbers in registers. | (15) |
| 24. |  | Explain in detail various steps adapted in Digital Signal Processors to speed up the operation. | (15) |
| (OR) | | | |
| 25. |  | Explain spectral analysis of non-stationary signals and random signals. | (15) |

ALL THE BEST