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**End Semester Examination – Nov/Dec– 2018**

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| **Code:** | **12EC216** | **Duration :** | **3hrs** |
| **Sub. Name:** | **DIGITAL SIGNAL PROCESSING** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Compute the DFT of a step signal shifted by no. | 1 |
| 2. | Define discrete Fourier Transform. | 1 |
| 3. | Give any one characteristic of a chebyshev filter. | 1 |
| 4. | Define a Chebyshev Type I filter. | 1 |
| 5. | Define Rectangular window. | 1 |
| 6. | FIR filters are stable. Justify. | 1 |
| 7. | Express the fraction  in sign magnitude form. | 1 |
| 8. | Define quantization step size. | 1 |
| 9. | Classify digital signal processors. | 1 |
| 10. | What are the advantages of Signal Processors? | 1 |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | Compare discrete Fourier transform with fast Fourier transform. | 3 |
| 12. | Design an analog high pass filter with pass band attenuation of 3 dB at 1000 rad/sample and stop band attenuation of 15dB at 500 rad/sample. | 3 |
| 13. | Draw direct form structure for the system described by the equation  y (n) = 0.5x (n) + 0.9 x (n–1). | 3 |
| 14. | Write short notes on 1’s complement and 2’s complement representation. | 3 |
| 15. | Discuss the mechanism of pipelining to speedup the execution of an instruction. | 3 |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. |  | Compute the DFT for the sequence by using radix-2 DIF FFT | 15 |
| (OR) | | | |
| 17. |  | Compute the eight-point DFT for the sequence  by using DIF algorithm. | 15 |
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| 18. |  | Design a Low Pass Filter using rectangular window by taking 9 samples of (n) and with a cut-off frequency of 1.2 rad/sec. Draw the realization for the same. | 15 |
| (OR) | | | |
| 19. |  | Design a Chebyshev low pass filter with the specifications using bilinear transformation.  Ap = 1dB ripple in the pass band 0 ≤ ω ≤ 0.2Π  As = 15 dB ripple in the stop band 0.3Π ≤ ω ≤ Π | 15 |
| 20. |  | Determine the filter coefficients obtained by sampling for N = 7 for the following frequency response and find. | 15 |
| (OR) | | | |
| 21. |  | Using frequency sampling, Determine the coefficients of a linear phase FIR filter of length N=15 which has a symmetric unit sample response and a frequency response that satisfies the following condition. | 15 |
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| 22. | a. | Explain coefficient quantization error with an example. | 7 |
| b. | Find the steady state variance of the noise in the output due to quantization of input for the first order filter . | 8 |
| (OR) | | | |
| 23. |  | Explain zero input limit cycle oscillations and derive the equation for dead band. | 15 |
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| 24. |  | Draw and explain the architecture of TMS320C5416. | 15 |
| (OR) | | | |
| 25. | a. | Derive the Wiener-Hopf equation and explain basic wiener filter theory in detail. | 8 |
| b. | Explain Least Mean Square algorithm in detail. | 7 |