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

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| **Code :** | **10EI204 / 12EI209** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **SIGNALS AND SYSTEMS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Define unit Impulse. | 1 |
| 2. | Sketch the signal u(t-1). | 1 |
| 3. | Give the convolution sum expression. | 1 |
| 4. | Differentiate natural and forced response. | 1 |
| 5. | Compute the power for the nth real harmonic of x(t) using the complex Fourier series coefficient Cn.. | 1 |
| 6. | If the function x(t) is an odd function then the complex exponential Fourier series coefficient is  a. purely real b. purely imaginary c. purely complex. | 1 |
| 7. | Define magnitude response. | 1 |
| 8. | State sampling theorem. | 1 |
| 9. | Find the unilateral Laplace transform of signal x(t)=δ(t). | 1 |
| 10. | Give any two properties of the ROC of X(z). | 1 |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | List the different transformation that can be performed on the independent variable of signal. | 3 |
| 12. | State the properties of convolution sum. | 3 |
| 13. | State and prove Parseval’s relation for the given sequence x(n) = {1,1,1,1}. | 3 |
| 14. | Determine the Fourier transform of the signal *x(t) = e-atu(t)*. | 3 |
| 15. | Find the Z-transform of *x(n)=(1/2)n u(-n)*. | 3 |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. |  | Let be a signal with  Find in graphical representation.  (i) (ii)  (iii)  (iv) (v) | 15 |
| (OR) | | | |
| 17. | a. | Find the even and odd components of the following signals.  *x(t) = cos t + sin t + cos t sin t* | 5 |
|  | b. | Check whether the given system *y(n) = x(n)x(n*-1*)* is Static or dynamic, Causal or non-causal, Time variant or Invariant and Linear or non - linear. | 10 |
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| 18. |  | An LTI system is characterized by its impulse response *h[n]* = {1,3,3,2}. Determine the response of the system to an input *x[n]* = {1,3,1,1}. Use graphical method. | 15 |
| (OR) | | | |
| 19. |  | Using Classical method, solve if the initial conditions are y(0) = 9/4; = 5; and *x(t)* = *e-3tu(t)*  Assume T = 1 sec. | 15 |
|  |  |  |  |
| 20. |  | Determine the exponential Fourier series coefficient Cnof the given periodic signal. | 15 |
| (OR) | | | |
| 21. | a. | Determine the spectrum of x(t) = cos ωot by using frequency shifting property. | 8 |
|  | b. | Compute the Fourier transform of a rectangular pulse | 7 |
|  |  |  |  |
| 22. |  | Illustrate impulse train sampling and explain the process of reconstructing the original signal from its samples. | 15 |
| (OR) | | | |
| 23. | a. | Find the frequency response of a I order system described by the difference equation y(n) = ax(n-1) + x(n). | 5 |
|  | b. | Explain the discrete time processing of continuous time signals. | 10 |
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| 24. |  | State and prove any five properties of Laplace transform. | 15 |
| (OR) | | | |
| 25. | a. | Determine the z transform of *x(n) = anu(n) – bnu(-n-1)* and find the region of convergence. | 8 |
| b. | Find the inverse Z transform of  by using partial fraction expansion technique. | 7 |