****

**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**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **10EI204 / 12EI209** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **SIGNALS AND SYSTEMS** | **Max. marks :** | **100** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **Marks** |
| **PART-A(10X1=10 MARKS)** | | | |
| 1. | Define Random signal. | | 1 |
| 2. | Give the expression to find the average power of a signal x(t). | | 1 |
| 3. | An LTI system is linear and \_\_\_\_\_\_. | | 1 |
| 4. | Write the equation for convolution sum. | | 1 |
| 5. | What is Fourier Transform? | | 1 |
| 6. | Define frequency response. | | 1 |
| 7. | What is meant by aliasing effect? | | 1 |
| 8. | The DTFT of x[n] = {1,2,1,1} is \_\_\_\_\_\_. | | 1 |
| 9. | Define ROC. | | 1 |
| 10. | The Z transform of unit impulse signal is \_\_\_\_\_\_. | | 1 |
| **PART B (5 X 3= 15 MARKS)** | | | |
| 11. | Find the even and odd components of x(t) = Sin(t) + 2t Cos(t). | | 3 |
| 12. | What is a BIBO stable system? | | 3 |
| 13. | Find the CTFT of x(t) = e-at u(t). | | 3 |
| 14. | State Sampling Theorem. | | 3 |
| 15. | What are the methods to find the Inverse Z transform? | | 3 |
| **PART C (5 X 15= 75 MARKS)** | | | |
| 16. | a. | Check periodicity and find fundamental period of  i. x(t) = sin5πt  ii. x(t) = Sin15πt + Sin 20πt | 7 |
| b. | Given the signal x(t),    **2**  **1**  **1**  **t**  **x(t)**  Determine a. y(t) = x(t + 1)  b. y(t) = x(2-2t)  c. y(t) = x(t/2 – 3) | 8 |
| (OR) | | | |
| 17. | a. | Find whether the signal is power or energy signal: | 5 |
| b. | Find whether the system describe by the equation  is   1. Linear or non linear 2. Time variant or Time invariant 3. Static or Dynamic 4. Causal or Non-causal | 10 |
| 18. | a. | Perform Continuous time convolution  between | 10 |
| b. | State the properties of convolution | 5 |
| (OR) | | | |
| 19. | a. | Find the response of a system whose input x[n]={1,2,3,1} and impulse response  h[n] ={2,4,2,1} | 10 |
| b. | Determine the natural response of the system represented by the differential equation | 5 |
| 20. | a. | An LTI system is described by the differential equation, .  Use Fourier transform to determine the frequency response of the system. Also find the response  of the system if input applied at t = 0 is x(t)=e-3tu(t) | 10 |
| b. | State and prove any two properties of CTFS | 5 |
| (OR) | | | |
| 21. | a. | Find the CTFT of x(t) = e-a|t| | 8 |
| b. | Compute the DTFT of a Unit Step Signal | 7 |
| 22. | a. | Find the DTFT given x(n) = (1/2)n u[n] – (1/4)n u[n]. | 5 |
| b. | Given . Determine the frequency response and  impulse response | 10 |
| (OR) | | | |
| 23. | a. | State and prove Sampling Theorem. | 10 |
| b. | Consider the analog signal  What is the Nyquist rate of the signal? | 5 |
| 24. | a. | Find the inverse z-transform of the following X(z) by the partial fraction expansion method for the ROC ׀z׀ > 1 | 10 |
| b. | State and prove any three properties of Z transform. | 5 |
| (OR) | | | |
| 25. | a. | Find the z-transform of y(n) = an u(n) – bn u(-n-1) | 5 |
| b. | Determine the system function and unit sample response for the system governed by the  difference equation y (n) + (1/4) y(n-1) = x(n) + (1/2) x(n-1). Use Z transform. | 10 |

ALL THE BEST