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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 :** | **EC285** | **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. | Unit ramp signal can be represented in terms of unit step signal is---------------------- | (1) |
| 2. | Find whether the signal x(t1/2) is causal or not | (1) |
| 3. | Distinguish between Fourier series and Fourier transform | (1) |
| 4. | Find the inverse fourier transform of X(jω) = 2 π δ(ω). | (1) |
| 5. | If L(x(t)) = X(s), then L(x(-t)) is \_\_\_\_\_\_\_\_\_\_. | (1) |
| 6. | A signal sampled at a rate lesser than nyquist rate is said to be \_\_\_\_\_\_\_\_\_\_\_. | (1) |
| 7. | The Fourier Transform exist only if the signal must satisfy---------conditions | (1) |
| 8. | Find DTFT of δ[n-k]= ------- | (1) |
| 9. | Z transform of the impulse signal is unity (True/False) | (1) |
| 10. | Mention any two methods to find inverse z-transform | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | Test whether the following signal is periodic or not. If the signal is periodic, calculate the  Fundamental period. x(t) = 3Cos(10 π t + π/6) | (3) |
| 12. | Find the convolution of the sequence x(n) = {1, -1, 2, 3} and h(n) = {1, 2, -1, 2} | (3) |
| 13. | Find the Nyquist rate and Nyquist interval for the given message signal  x(t)= cos(200πt) +sin(400πt) | (3) |
| 14. | State and prove the time reversal property of DTFT. | (3) |
| 15. | Find the Z transform and ROC of x(n) = {1,3,1, -4, 2, 3} | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. |  | Check whether given system y(t) is Time-invariant, static, Linear, causal and justify the answer   1. y[n] = cos [x(n)] 2. y(t)=4 x(t)+6 | (15) |
| (OR) | | | |
| 17. |  | Sketch each of the following signals derived from unit step signal u(t)   1. x1(t)=u(t+2) 2. x2(t)=u(t-2) 3. x4(t)=u(-2t+1) 4. x5(t)=u(-2t-1) 5. x6(t)=x1(t)-x2(t) | (15) |
| 18. |  | Consider a speech recognition system whose excitation x(t) and response y(t) is related by the differential equation .   1. Determine the frequency response of the speech recognition system 2. If the input x(t) = e-t u(t) is applied to the system then find the output y(t) | (15) |
| (OR) | | | |
| 19. | a. | Find the Convolution of the two signals  x(t)=e-at u(t) and  h(t)=e-bt u(t) using FT | (10) |
| b. | State and prove Convolution property of CTFT. | (5) |
| 20. | a. | A signal has laplace transform of X(s)=s+2/(s2+4s+5) find LT of Y(s) for the following signal  (i) y1(t)=tx(t) (ii)y2(t) = x(t)\*x(t) | (10) |
| b. | Find X(S) if x(t)=e-b|t| and plot the signal in S domain. | (5) |
| (OR) | | | |
| 21. |  | Show that a signal x(t) can be uniquely reconstructed from its samples if its sampling frequency Fs > 2Fm. | (15) |
| 22. |  | Find the FT of the following signals   1. x(n)= δ(6-2n)+ δ(6+2n) 2. x(n)=-anu(-n-1) | (15) |
| (OR) | | | |
| 23. | a. | Find the DT signal x(n) if the Fourier Transform is  (i) X(ejω) = 2 cos 2ω  (ii) X(ejω) = e-jω for – π ≤ ω≤ π. | (10) |
| b. | Find the DTFT of the signal x(n)=a|n| | (5) |
| 24. | a. | Find the impulse response and step response for the following system | (15) |
| (OR) | | | |
| 25. | a. | What is meant by ROC of Z transform? Explain its significance | (5) |
| b. | Determine Z transform for the signal x(n) = 7 (1/3)n u(n) – 6(1/2)n u(n) and plot the ROC . | (10) |

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