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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

**End Semester Examination – April/May– 2017**

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| **Sub. Code:** | **14EC2003** | **Duration :** | **3hrs** |
| **Sub. Name:** | **SIGNALS AND SYSTEMS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | For the waveform of x(t) given below in Fig(1), determine  (i) x(-t) (ii) 4 x(t) (iii) (-3t+2) | CO1 | 15 |
| b. | Check whether the given signal x(t)=2cos(10t) - sin(4t-1) is periodic or not, if it is periodic, find its fundamental period | CO1 | 05 |
| (OR) | | | | |
| 2. | a. | Check whether the given system is Dynamic, Causal, Time Invariant and Linear. y(t) = 10x(t) + 5 | CO1 | 16 |
| b. | Check whether the given signal x(n)=sin(2πn) + sin(6πn) is periodic or not, if it is periodic, find its fundamental period. | CO1 | 4 |
| 3. | a. | By using CTFT, find the frequency response of an LTI system described by the differential equation. | CO2 | 8 |
|  | b. | By using partial fraction expansion, find the inverse Fourier transform of | CO2 | 12 |
| (OR) | | | | |
| 4. | a. | Write any four Properties of Continuous Time Fourier Transform. | CO2 | 4 |
|  | b. | The input and output of a causal LTI system are represented by the differential equation  . Assume initial conditions are zero.  Find the following by using Fourier transform  (i) Impulse response of the system (ii) frequency response of the system | CO2 | 16 |
| 5. | a. | The input and output of a causal LTI system are represented by the differential equation  .  Find the Impulse response by using Laplace transform. | CO2 | 12 |

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|  | b. | Using Laplace transform, Find the initial and final value of | CO2 | 8 |
| (OR) | | | | |
| 6. | a. | Find the Inverse Laplace of | CO2 | 15 |
|  | b. | Determine the Laplace transform and ROC of e(-4t)u(t) | CO2 | 5 |
| 7. | a. | The signal x(t)=10 cos(10πt) is sampled at a rate 8 samples per second. What is Sampling frequency and the Nyquist rate ? | CO3 | 6 |
|  | b. | Find the DTFT of the following   1. {1,-1,2,5} (ii) (0.5)nu(n)+ 2nu(-n-1) | CO3 | 14 |
| (OR) | | | | |
| 8. | a. | Using DTFT, find the frequency response of a given difference equation:y(n)-0.25y(n-1)-0.375y(n-2)=x(n)+x(n-1) | CO3 | 12 |
|  | b. | Find the Fourier transform of the following:   1. δ (n+2)- δ(n-2) (ii) u(n-k) | CO3 | 8 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Find the final value of | CO3 | 8 |
|  | b. | Using long division method, determine the inverse z-transform of | CO3 | 12 |

**ALL THE BEST**