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



**End Semester Examination – Nov/Dec– 2017**

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| **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. | Check whether given system y(t) is i. Time-invariant ii. static  iii. Linear v. causal and justify the answer.  y(t)=20x(t)+7 | CO1 | 12 |
| b. | Check the following signals are energy signal or power signal and obtain the corresponding energy, power values.  i. x(t)=cos t ii. x[n]=(1/3)nu(n) | CO1 | 8 |
| (OR) | | | | |
| 2. | a. | Given the signal x(t),Determine the following  i. y(t) = x(t + 1) ii. y(t)=x(-t+2) iii. y(t)=x(2t+3) iv.y(t)=x(-0.5t-1)    **2**  **1**  **1**  **t**  **x(t)** | CO1 | 12 |
| b. | The impulse response of the system is h(t)=u(t-3) and the input is x(t)=e2tu(-t).Find the response of the system y(t) using convolution. | CO1 | 8 |
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| 3. |  | State and prove any five properties of CTFT. | CO2 | 20 |
| (OR) | | | | |
| 4. |  | Consider a speaker recognition system whose excitation x(t) and response y(t) is related by the differential equation .   1. Determine the frequency response of the speaker recognition system 2. If the input x(t) = e-t u(t) is applied to the system then find the output y(t) | CO2 | 20 |
|  |  |  |  |  |
| 5. | a. | Show that a signal x(t) can be uniquely reconstructed from its samples if its sampling frequency Fs> 2Fm. | CO2 | 15 |
|  | b. | Find the Laplace transform and ROC for the following signal x(t)=e-b|t| | CO2 | 5 |
| (OR) | | | | |
| 6. | a. | State and prove convolution property of Laplace Transform. | CO2 | 6 |
|  | b. | Find the Laplace transform and ROC for the following signal x(t)=e-2t u(t)+ e-tcos 3t u(t) | CO2 | 14 |
|  |  |  |  |  |
| 7. | a. | Find the DTFT of the following signals  i. x(n)= {1,-1,2,2} ii. x(n)= (0.5)nu(n)+2-nu(-n-1) | CO3 | 12 |
|  | b. | Find the frequency response of the causal system described by the difference equation  y(n)-0.25y(n-1)-0.375 y(n-2)=x(n)+x(n-1). | CO3 | 8 |
| (OR) | | | | |
| 8. |  | Find the impulse response and step response for the following system | CO3 | 20 |
|  | | **Compulsory**: |  |  |
| 9. | a. | By using Long Division method, Find the inverse Z transform of  X(Z)=(1+5z-1)/(1-5z-1+z-2) when i. x(n) is causal ii. x(n) in anti-causal | CO3 | 15 |
|  | b. | Using Z transform find the convolution of two discrete time sequences.  x1(n)={1,2,-1,0,3}   x2(n)={1, 2,-1} | CO3 | 5 |

ALL THE BEST