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

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

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| **Code :** | **17EC2003** | **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. | Let be a DT signal with  Calculate in graphical representation.  (i) (ii)  (iii)  (iv) (v) | CO1 | 15 |
| b. | Determine the output of the system whose impulse response  h(n) = {1, 2, - 1, 3} and the input x(n) = {1, 2, 1}. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Calculate the convolution of input signal x(t) and impulse response h(t)  x(t)= 1 for 0≤t≤2  h(t)=1 for 0≤t≤3 | CO1 | 5 |
| b. | Find the total response of the system described by the difference equation  y(n) – 1.5y(n-1) + 0.5y(n-2) = x(n) and y(-1)=1; y(-2)=0; and the input is x(n) = 2nu(n). | CO1 | 15 |
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| 3. | a. | Determine the exponential Fourier series coefficients for the continuous time periodic signal    with fundamental period T=4 sec. | CO2 | 18 |
| b. | List the conditions for existence of fourier series. | CO4 | 2 |
| (OR) | | | | |
| 4. | a. | Consider a speaker recognition system whose excitation x(t) and response y(t) is related by the differential equation  (i) Determine the frequency response of the speaker recognition system.  (ii) If the input x(t) = e-t u(t) is applied to the system then find the output y(t). | CO6 | 10 |
| b. | State and derive parsevals theorem, convolution property of CTFT. | CO4 | 10 |
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| 5. | a. | State the sampling theorem. | CO3 | 2 |
| b. | If x(t) = sin (10πt)/( πt), determine sampling time Ts | CO3 | 3 |
| c. | Explain impulse train sampling with a neat diagram. | CO3 | 15 |
| (OR) | | | | |
| 6. | a. | Determine the sampling interval so that x(t) is uniquely represented by the Discrete –time sequence x(t) = x(nTs).  Given x(t) = cos(πt) + 3 sin (2πt) + sin (4πt). | CO5 | 5 |
| b. | Explain Discrete-time processing of continuous –time signals with a neat block diagram. | CO6 | 15 |
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| 7. | a. | Compute the Fourier series coefficients of | CO5 | 10 |
| b. | State any five properties of discrete time Fourier series. | CO3 | 5 |
| c | Obtain the DTFT of unit impulse and unit step sequences. | CO5 | 5 |
| (OR) | | | | |
| 8. | a. | Derive the frequency response and impulse 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). | CO6 | 10 |
| b. | State and prove any four properties of DTFT. | CO3 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Determine the laplace transform and ROC for the following signals   1. x(t)=e-2t u(t)+ e-tcos 3t u(t) 2. y(t)=e-|b|t | CO2 | 10 |
| b. | 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) is anti causal. | CO5 | 10 |