**Code No.PC302EC**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY (An Autonomous Institution)**

**B.E. (ECE) III-Semester (AICTE) (Supplementary) Examination, Aug -2023**

**Subject: SIGNALS AND SYSTEMS**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer all the questions.**

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| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| 1. a | Check whether the given signal is an energy or power signal x(t) = e-3t.u(t) | 2 | 1 | L2 |
| b | Define Causal system with example. | 2 | 1 | L1 |
| c | Define exponential Fourier series. | 2 | 2 | L1 |
| d | State the condition for orthogonality between the signals x(t) and y(t). | 2 | 2 | L1 |
| e | Find the Fourier Transform of e-2t u(t). | 2 | 3 | L2 |
| f | Find the Laplace transform and ROC of the signal x(t)= | 2 | 3 | L2 |
| g | Determine whether the system y(n)= is linear or non-linear system? | 2 | 4 | L2 |
| h | Find the DTFT of the unit step function? | 2 | 4 | L2 |
| i | Find the transfer function of the system given by  y(n-2)+2y(n-1)+3y(n)=x(n-1)+4x(n) using Z-Transform. | 2 | 5 | L2 |
| j | Using initial value theorem, find x(), if X(z) = | 2 | 5 | L2 |

**PTO**

**PART-B**

**Answer Any Five questions**.

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| 2. | a | For the signal x(t) given below, sketch the following signals.    i. x(t -2)  ii. x(2t+3)  iii. x( t)  iv. x(1 - t) | 5 | 1 | L2 |
| b | Explain the continuous elementary signals. | 3 | 1 | L1 |
| 3. | a | Determine the trigonometric form of Fourier series representation of the signal x(t) as shown in figure. | 5 | 2 | L3 |
| b | Check whether the following signals are orthogonal or not?X1(t)=Sinnwot and X2(t)=Cosmwot[to, to+(2π/wo)] | 3 | 2 | L2 |
| 4. | a | State & prove the Fourier Transform properties.  a) Time shifting property b) Convolution in time domain | 4 | 3 | L2 |
| b | Find the inverse Fourier transform of the function X(w)= | 4 | 3 | L3 |
| 5. | a | State and prove Sampling Theorem with neat Sketch? | 5 | 4 | L2 |
| b | Find the DFT of the given periodic sequence | 3 | 4 | L2 |
| 6. | a | State and Prove Initial value theorem and final value theorem of Z-Transform? | 4 | 5 | L2 |
| b | Find the inverse Z-Transform of the signal X(z)= by using partial fractions method, if   1. ROC: 2. ROC: | 4 | 5 | L3 |
|  |  |  |  |  |  |
| 7. | a | Check whether the following system is static or dynamic, causal or non-causal? y(t)=x(t)+x(t-2) | 4 | 1 | L2 |
| b | State and prove properties of Laplace transform.  (i)Linearity property (ii) Time shifting property | 4 | 2 | L2 |
| 8. | a | Find the unilateral Laplace transform and ROC of the signal x(t)= | 4 | 3 | L3 |
| b | Find the DTFT of the signal x(n)=cosn.u(n) | 3 | 4 | L2 |
| 9. | a | Find the Z-transform and ROC of the signal x(n)= | 4 | 5 | L3 |
| b | Find the inverse Laplace transform of the signal X(s) = by using partial fractions method? | 4 | 3 | L3 |

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