18EI403

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| II/IV B.Tech (Regular) DEGREE EXAMINATION | | | | |
| **July , 2021** | **Electronics & Instrumentation Engineering** | | | |
| **Fourth Semester** | | **Signals and Systems** | | |
| Time: Three Hours | | | Maximum : 50 Marks | |
| *Answer Question No.1 compulsorily.* | | | | (1X10 = 10 Marks) |
| *Answer ONE question from each unit.* | | | | (4X10= 40 Marks) |

1. Answer all questions.

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| a | Write the definition of a signal. |
| b | Give two examples for continuous time signals. |
| c | What is the condition for a system to be causal? |
| d | Plot Signum function, |
| e | Write the CTFS representation of a function. |
| f | Write the Time Shifting property of Fourier Series. |
| g | Write the expression for finding Fourier Transform of . |
| h | Write the Fourier Transform of . |
| i | Write the time domain convolution property of Fourier Transform. |
| j | Write the expression for finding Energy Spectral Density, . |

**UNIT – I**

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| 2.a | Check the Linearity, Causality, Stability and Time Invariance of the following system. | 5M |
| 2.b | Determine the Average Signal Power () of the signal . | 5M |

**(OR)**

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| 3.a | Determine the derivative of the signal given by and plot the waveform | 5M |
| 3.b | Find the numerical value of the integral | 5M |

**UNIT – II**

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| 4.a | Compute the response of continuous time LTI system described by its impulse response  to the unit step signal . | 5M |
| 4.b | Prove Time Reversal property of Fourier Series. | 5M |

**(OR)**

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| 5.a | Obtain the block diagram realization of the differential equation using Differentiators. | 5M |
| 5.b | Determine the Fourier Series of signal given by | 5M |

**UNIT – III**

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| 6. | Determine the Fourier Transform of the following signals.  (i) (ii) | 10M |

**(OR)**

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| 7.a | Prove Time Scaling and Frequency Scaling properties of CTFT. | 5M |
| 7.b | Write about Numerical Computation of the Fourier Transform. | 5M |

**UNIT – IV**

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| 8.a | Plot the correlogram of the following pair of signals  and where . | 5M |
| 8.b | State and prove sampling theorem. | 5M |

**(OR)**

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| 9.a | Determine the correlation function for the following pair of energy signals:  and . | 5M |
| 9.b | Find the autocorrelation of . | 5M |

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