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| **20EE404**  **Hall Ticket Number:**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | | **II/IV B.Tech (Regular\Supplementary) DEGREE EXAMINATION** | | | | | **July/August, 2023** | **Electrical &Electronics Engineering** | | | | **Fourth Semester** | **Signals & Systems** | | | | **Time:** Three Hours | | **Maximum:** 70 Marks | | | ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** | | ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** | |  |

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|  |  |  | CO | BL | M |
| 1 | a) | What is the condition for orthonormality? | CO1 | L2 | 1 |
|  | b) | What is the relation between Z- transform and Fourier transform of a signal? | CO3 | L2 | 1 |
|  | c) | Find the FT of unit ramp function. | CO3 | L2 | 1 |
|  | d) | What is anti- aliasing filter? | CO3 | L2 | 1 |
|  | e) | What is aliasing effect? | CO4 | L4 | 1 |
|  | f) | Define Nyquist interval. | CO4 | L1 | 1 |
|  | g) | What is the relation between rise time and bandwidth of a linear system? | CO3 | L2 | 1 |
|  | h) | Define Fourier complex spectrum | CO3 | L3 | 1 |
|  | i) | What is the area under unit impulse function? | CO1 | L1 | 1 |
|  | j) | Define Causal system | CO2 | L1 | 1 |
|  | k) | What is the nature of ROC of Z-transform for an anti-causal sequence | CO1 | L3 | 1 |
|  | l) | Write the expression for Fourier Transform of unit step sequence | CO1 | L1 | 1 |
|  | m) | What is nyquist interval of signal x(t)=19 cos22000πt | CO4 | L3 | 1 |
|  | n) | What do you mean by even symmetry? | CO1 | L1 | 1 |
| **Unit-I** | | | | | |
| 2 | a) | Find the even and odd parts of the signal shown in Figure. | CO1 | L2 | 7M |
|  | b) | Show that the unit impulse function is the derivative of unit step function | CO1 | L2 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Define the following:  i) Energy-type signals ii) Power-type signals | CO1 | L1 | 7M |
|  | b) | If x(t)= U(t)-U(t-1), sketch y(t)=x(5t+7) | CO1 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Explain the difference between the following systems   1. Time invariant and Time variant systems 2. Causal and non-causal systems | CO2 | L1 | 7M |
|  | b) | Determine whether or not the following systems are Time Invariant and causal | CO2 | L2 | 7M |
| **P.T.O**  **20EE404**  **(OR)** | | | | | |
| 5 | a) | Explain how input and output signals are related to impulse response of a LTI system. | CO2 | L2 | 7M |
|  | b) | Describe the following system classification  i)Linear and Non Linear systems  ii) Time variant and Time invariant  iii)Stable and Unstable system | CO2 | L2 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | Find the Fourier Transform and draw the spectrum of the following signals: i)unit step signal ii)signum function | CO3 | L2 | 7M |
|  | b) | State and prove the following Fourier Transform properties  i)Time convolution,  ii)Frequency Convolution  iii) Time Integration | CO3 | L2 | 7M |
| (OR) | | | | | |
| 7 | a) | ) State and prove z –transform time reversal and differentiation in z – domain properties. | CO3 | L2 | 7M |
|  | b) | Find the inverse z – transform of    With ROC of 0.2<IzI<1. | CO3 | L2 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Distinguish between instantaneous sampling, natural sampling and flat top sampling. | CO4 | L2 | 7M |
|  | b) | What is zero order hold? Obtain the transfer function of zero order hold. | CO4 | L2 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Determine the Nyquist sampling rate and Nyquist sampling interval for the signals.  (a) sinc(100πt). (b) sinc2(100πt).  (c) sinc(100πt) + sinc(50πt). (d) sinc(100πt) + 3 sinc2(60πt) | CO4 | L2 | 7M |
|  | b) | Discuss Natural sampling and effect of under sampling. | CO4 | L2 | 7M |

