

Registration No.:

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Total Number of Pages: 02

Course: B.Tech
Sub_Code: REL4D002/REE4D002

4th Semester Regular/Back Examination: 2023-24

SUBJECT: Signal and Systems

BRANCH(S): Electrical, EEE

Time: 3 Hour

Max Marks: 100

Q. Code: P151

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions: (2 x 10)

- How does a discrete-time signal differ from a continuous-time signal?
- How do you represent the input and output of a system mathematically?
- What do you mean by impulse response of a discrete-time system?
- What is the significance of convolution in discrete-time system analysis?
- Discuss the relationship between continuous-time Fourier transform and the Fourier series representation of periodic signals.
- Write down the property of linearity in Fourier series.
- How Z-transform is used to analyze linear time variant (LTI) systems?
- How do you test if a system is time-invariant or not?
- How the concept of linearity applies to the Fourier transform?
- Explain the time reversal property of the DFT.

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Distinguish between periodic and aperiodic discrete time signal.
- Check the system for stability: $y(t) = ts(t)$, $y(t) = \exp\{s(t)\}$.
- What are the advantages of analyzing signals and systems in the frequency domain for LTI systems?
- Distinguish between Cross Correlation and Auto Correlation.
- Determine the normalized energy & power of $s(t) = 8\exp(j4t)u(t)$.
- Check for the causality of the system $y(t) = s(t-2) + s(2-t)$.
- Check for linearity of the system described by $y''(t) + 2y(t) = s(t)$.
- What is one-sided Z-transform? Describe the mathematical expression for it.
- Find out the unit impulse response of $y(n) - [y(n-2)]/n = 2s(n)$.
- Discuss the advantages and disadvantages of using circular convolution in signal processing applications.
- Determine the convolution of any trigonometric signal & logarithmic signal.
- Check the system for causality & stability of $h(n) = (1/5)^n u(n)$.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** a) What are the basic operations of signals? Illustrate with an example. (8)
b) What are the fundamental classifications of discrete-time signals? (8)
- Q4** a) Explain graphical representation of convolution with example. (8)
b) Discuss the inversion of z-transform by partial fraction method. (8)
- Q5** a) Write down the properties of CTFT. (8)
b) Find out the z-transform of $s(n) = u(n)$ and $s(n) = A^n u(n)$. (8)
- Q6** a) State and prove the initial & final value theorem of z-transform. (8)
b) Write down the properties of z-transform. (8)