



# SIGNALS AND SYSTEMS TUTORIAL ASSIGNMENTS

MODEL - SIGSYS100ASS

This Software trainer provides Signals and Systems Tutorial Assignments.



## SPECIFICATIONS

1. Signals and Systems Tutorial Assignments.
2. **Books for Signals and Systems : 10 Nos in pdf Format**
3. **Mp4 Video Class for Signals and Systems : 40 Classes in Mp4 on Pen Drive**

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**Dealer:-**

## EXPERIMENTS

1. A) Sketch and write defining mathematical expression for the following signals in CT and DT
  - a) Unit Step.
  - b) Rectangular
  - c) Exponential
  - d) Signum
  - e) Sine
  - f) Sinc
  - g) Triangular
  - h) Unit Impulse.
  - i) Unit Ramp
 B) Classify and find the respective value for the above signals
  - a) Periodic / Non Periodic
  - b) Energy / Power / Neither
2. Take any two CT and DT signals and perform the following operation Amplitude scaling, addition, multiplication, differentiation, integration (accumulator for DT), time scaling, time shifting and folding
3. Express any two system mathematical expressions in input output relation form and determine whether each one of them is, Memory less, Causal, Linear, Stable, Time in variant, Invertible
4. Express any two system mathematical expressions in impulse response form and determine whether each one of them is, Memory less, Causal, Linear, Stable, Time in variant, Invertible
5. State and prove the properties of CT Fourier Transform. Take rectangular and sinc signal as examples and demonstrate the applications of CTFT properties. And also demonstrate the interplay between the time and frequency domain
6. State and prove the properties of CT Laplace Transform. Take any example of a system in time domain and demonstrate the application of LT in system analysis
7. A) Find the following for the given energy signal
  - a) Autocorrelation
  - b) Energy from Autocorrelation
  - c) Energy from definition
  - d) Energy Spectral Density directly
  - e) ESD from Autocorrelation
 B) Find the following for the given power signal
  - a) Autocorrelation
  - b) Power from Autocorrelation
  - c) Power from definition
  - d) Power Spectral Density directly
  - e) PSD from Autocorrelation
8. A) List and Explain the properties of CDF & PDF, Suppose a certain random variable has the CDF

$$F_X(x) = \begin{cases} 0 & x \leq 0 \\ kx^2 & 0 < x \leq 10 \\ 100k & x > 10 \end{cases}$$

Evaluate k, Write the corresponding PDF and find the values of  $P(X \leq 5)$  and  $P(5 < X \leq 7)$

(This is only an example. Various Probability functions may be given)

- B) Find mean, mean square, standard deviation, variance of X  
when  $f_X(x) = ae^{-ax}u(x)$  with  $a > 0$

(This is only an example. Various Probability functions may be given)