

Code No: 123AW

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2016

SIGNALS AND SYSTEMS
(Common to ECE, EIE, ETM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define even and odd components of the signal how do you get it. [2]
- b) Sketch the unit step function and signum function bring the relation between them. [3]
- c) Distinguish between Series and Transform in the Fourier representation of a signal. [2]
- d) Define and write the conditions of sampling theorem. [3]
- e) Characterize a Linear Time Invariant (LTI) System. [2]
- f) Express and derive the Relationship between Bandwidth and Rise time. [3]
- g) Write the Convolution property of Fourier Transform. [2]
- h) Distinguish between Cross Correlation and Auto Correlation. [3]
- i) Write the Fundamental difference between Continuous and Discrete time signals. [2]
- j) Find the Z transform of $x[n] = u[-n]$. [3]

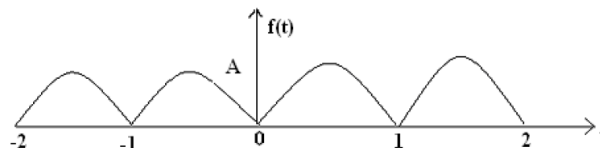
PART-B

(50 Marks)

- 2.a) Explain orthogonality property between two complex functions $f_1(t)$ and $f_2(t)$ for a real variable t .
- b) Define and derive the expression for evaluating mean square errors and its types. [5+5]

OR

3. Find the Exponential Fourier series for the rectified Sine wave as shown in figure. [10]



4. Obtain the Fourier transform of the following functions:
 - a) Impulse Signal
 - b) Single symmetrical Gate Pulse. [5+5]

OR

- 5.a) Write about the types of Sampling and compare the Impulse Sampling, Natural and Flat top Sampling methods.
- b) Describe about the Hilbert Transform and express its properties. [5+5]

6. Explain the difference between the following systems with examples.
 a) Linear and Non-linear systems.
 b) Causal and Non-Causal systems. [5+5]
- OR**
7. Define Time invariant and shift invariant systems and given the system function of a LTI system be $1/j\omega + 2$ evaluate the output of the system for an input $(0.9)^t u(t)$. [10]
- 8.a) Discuss and Prove Properties of auto correlation function.
 b) Explain briefly extraction of a signal from noise by filtering. [5+5]
- OR**
9. Discuss the impact of convolution for find the system output and Use the Convolution theorem to find the spectrum of $x(t) = A \cos^2 \omega_c t$. [10]
- 10.a) State the properties of the ROC of Laplace Transform and its existances.
 b) Find the step response of series RL circuit using Laplace transform method. [5+5]
- OR**
- 11.a) Find the inverse Z-transform and ROC given $X(z) = \log(1/1 - az^{-1})$.
 b) Derive relationship between z and Laplace Transform and describe about the stability. [5+5]

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