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]

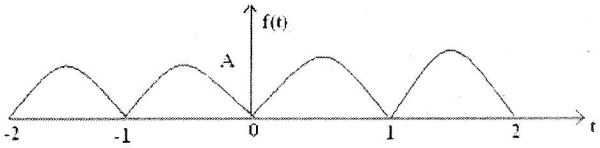
PART-B

(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/jw+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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