JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2017
SIGNALS AND SYSTEMS
(Common to ECE, EIE, BME)

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 Mean Square Error.	[2]
b)	What is an Orthogonal function?	[3]
c)	What is Signum Function?	[2]
d)	Write about the properties of Hilbert Transform.	[3]
e)	Define System Bandwidth.	[2]
f)	What is Causality?	[3]
g)	Define spectral density.	[2]
h)	When the convolution and correlation equivalent?	[3]
i)	What is steady state response?	[2]
j)	What is the condition for Z – transform exist?	[3]

PART-B
                                                                          (50 Marks)

2.a) Derive the expression for computing Mean square Error in approximating a function f(t) by a set of n orthogonal functions.
  b) Explain about the complete set of Orthogonal functions.   [5+5]
OR
3.a) Explain about the Trignometric Fourier series.
  b) Write about the complex fourier spectrum.   [5+5]

4.a) State and prove the time shifting and frequency shifting properties of Fourier transform.
  b) Explain about the effects of under sampling.   [5+5]
OR
5.a) State and Prove Sampling Theorem for bandpass signals.
  b) Write about the band pass sampling.   [5+5]

6.a) Write about the relationship between bandwidth and rise time in linear system.
  b) Explain about the Transfer function of a LTI system.   [5+5]
OR
7.a) Explain about the Impulse response of Linear system.
  b) Write about the Paley-Wiener criterion for physical realization of system. [5+5]

8.a) Determine the convolution of two sequences $x(n) = (1/2)^n u(n)$ and $h(n) = (1/4)^n u(n)$.
  b) Define Convolution Theorem in Time and Frequency domain and bring out the expression for convolution in Time domain. [5+5]

OR

9.a) Write about the Detection of periodic signals in the presence of Noise by Correlation.
  b) Explain about the Extraction of signal from noise by filtering. [5+5]

10.a) State and prove Time-reversal, Time-Shifting and scaling properties with respect to Z-transform.
  b) Using differentiation property find the Z-transform of $x(n) = n^2 u(n)$. [5+5]

OR

11.a) State and Prove Initial value and Final value theorem with respect to Laplace transform.
  b) Explain about the concept of Region of Convergence (ROC) for Laplace Transforms. [5+5]

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