

**A12**

**Sreenidhi Institute of Science & Technology**

(An Autonomous Institution)

**Code No: 3CC08**

**B. TECH. II – Year II – Semester Examinations, May 2015 (Regular)**

**SIGNALS AND SYSTEMS (ECM)**

**Time: 3 Hours Max. Marks: 70**

**Note: No additional answer sheets will be provided.**

**Part - A**

**Max.Marks:20**

**Answer all QUESTIONS.**

1. Evaluate the integral
2. Define Signum function and find its Fourier transform.
3. Define signal Bandwidth and system Bandwidth
4. State frequency convolution and time convolution.
5. What is Aliasing and how it can be minimized?
6. State and define the relation between Z Transforms and Laplace
7. State initial and final value theorems for Laplace Transforms.
8. State the properties of Auto Correlation of Energy signals.
9. Determine the Z Transform of (0.5)n u(n) and indicate ROC.
10. Find the Energy of a signal x(t)=Ae-at u(t) ; a>0

**Part – B**

**Max.Marks:50**

**ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS.**

1 (a) Find the Trigonometric Fourier Series of the following waveform. (6M)

x(t)

5

0 2π 4π 8π wot

(b) Define Mean Square Error and derive the expression for evaluating Mean Square Error. (4M)

2 (a) State and prove the Frequency differentiation and time differentiation properties of Fourier Transform.

(b) Obtain the Fourier Transform of the following signals and draw their spectra. (i) Cosωot

(ii) Sinωot

3 (a) Find the Linearity, time invariance and causality of the following systems. (6M)

1. y(t)=t x(t)
2. y(t)=sin x(t)

(b) Discuss the impulse response of ideal low pass filter by plotting it magnitude

and phase response. (4M)

4 (a) The impulse response of the LTI system is h(t)=u(t). Determine the output of the

System, if the input x(t) =e-at u(t), a>0 (6M)

(b) State and prove Parseval’s theorem. (4M)

5 (a) Show that a signal x(t) can be reconstructed from its samples, if the samples

are taken at the rate of twice the highest frequency of signal? (6M)

(b) Find the **Nyquist** rate of the following signals. (4M)

1. x1(t)= 10 Sinc2t
2. x2(t)=25 Cos500πt

6 (a) Find the Z-Transform of the following sequences

1. x(n)=n an u(n)
2. x(n)=n an-1 u(n)

(b) Find the inverse Z-Transform of the following:

X(Z) = Z ; ІZІ>2

Z(Z-1)(Z-2)2

7 (a) Derive the condition for Distortionless transmission through system. (6M)

(b) Determine the inverse Laplace Transform of the following functions. (4M)

(i) F1(S) = 1 (ii) F2(S) = K

S(S+1) (S+a) (S+b)

8 (a) Determine the Auto correlation function and Energy spectral density of

x(t)=e-atu(t)

(b) State and prove the following properties of Z-Transform

(i) Time shifting

(ii) Time convolution

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