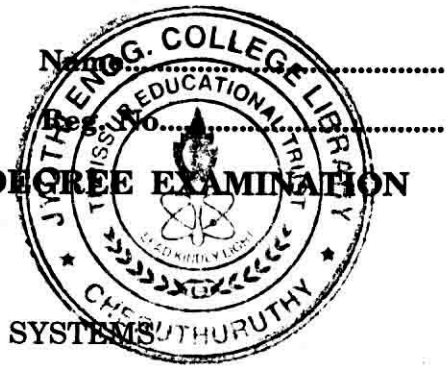


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FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION  
APRIL 2014

(2009 Scheme)

EE 09 403/PTEE 09 402—SIGNALS AND SYSTEMS

Time : Three Hours

Maximum : 70 Marks

**Part A**

All questions are compulsory.

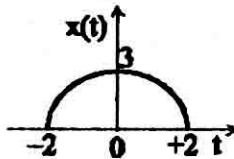
1. Differentiate between even and odd signals.
2. What is energy spectral density ?
3. What is aliasing ?
4. Mathematically express the sampling process.
5. Draw a typical ROC of the Z-transform for a causal sequence.

(5 × 2 = 10 marks)

**Part B**

Answer any four questions.

1. An analog signal  $x(t)$  is given by :



Then sketch the following :

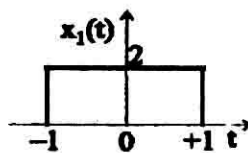
(a)  $3x[(t + 1)/2]$ .

(2½ marks)

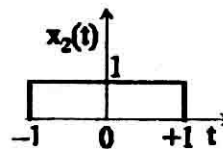
(b)  $x(3t - 2) + 2$ .

(2½ marks)

2. Two analog signals are given by :



and



Draw their convolution result, i.e.,  $x_1(t) * x_2(y)$ .

Turn over

3. Define Laplace transform of a signal  $x(t)$ . Write down the Laplace transforms of  $\delta(t)$  and  $u(t)$ .
4. What is meant by the frequency response of discrete time systems?
5. Find the Z-transform of  $x(n) = (0.2)^n u(n)$ . Plot its ROC.
6. Find the DTFT of  $x(n) = (0.2)^n u(n)$ .

(4 × 5 = 20 marks)

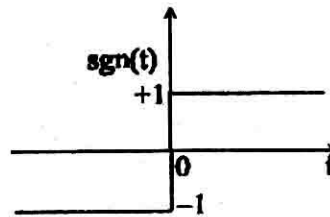
**Part C**

1. (a) What is meant by a linear time invariant system? Show that the output of such a system can be represented by the convolution integral.

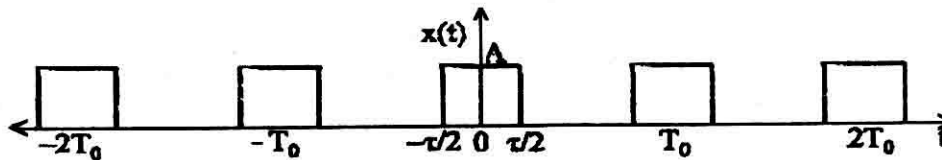
*Or*

- (b) Classify signals.

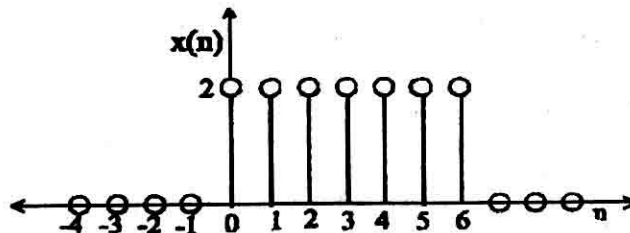
2. (a) Define CTFT. Compute and plot the CTFT of the signum function :

*Or*

- (b) Define CTFS. Compute and plot the CTFS of the pulse train shown below :



3. (a) Compute and plot the DTFT of the given sequence :

*Or*

- (b) With the help of both time domain and frequency domain diagrams, explain the sampling and the reconstruction process.
4. (a) From the generalized constant coefficient difference equation of a discrete time system, derive the system function. Hence comment on the two categories of discrete time systems. What are the poles and zeros? State the condition for stability.

*Or*

- (b) State and prove initial value theorem and final value theorem for Z-transform.

(4 × 10 = 40 marks)