D 50652 **(Pages : 2)** **Name**.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, NOVEMBER 2013

CS/PT CS 09 503—SIGNAL PROCESSING

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Write the major classification of signals.
2. State the Parseval's theorem for Fourier transform.
3. What is amplitude spectrum ?
4. What is aliasing ?
5. What is zero input response ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Write short notes on Static and dynamic systems with suitable examples.
2. Explain how non-periodic signals can be represented by Fourier transform ?
3. What are the basic concepts of BIBO stability ?
4. How to find the solution to differential equations using Fourier transform ?
5. Discuss about any *two* properties of Discrete Time Fourier Transform (DTFT).
6. Write notes on right-hand finite sequence and left-hand finite sequence.

(4 × 5 = 20 marks)

Part C

1. Explain about the properties of Linear Time-Invariant systems with suitable examples.

Or

2. Plot the following sequences :

   (a) $x(n) = 2\delta(n+1) - \delta(n-4)$.

   (b) $x(n) = \left\{0, 2, -1, \underset{\uparrow}{0}, 1, 2, 1, 0, -1, 1\right\}$.

3. Find the Fourier transform of the time function :

$$f(t) = 5\left[u(t+3) + u(t+2) - u(t-2) - u(t-3)\right].$$

Or

4. Write notes on Energy Spectral density and Phase Spectrum.

5. The impulse response of a discrete LTI system is $h(n) = \frac{1}{\pi}\sin\left(\frac{\pi}{4}\right)n$. Find the output response of the system when $x(n) = \frac{1}{\pi n}\sin\left(\frac{\pi}{2}\right)n$.

Or

6. Write notes on :
   (a) Energy spectral density.
   (b) Aliasing.

7. Explain about various methods of finding inverse z-transform.

Or

8. Find the z-transform of the following discrete-time signals including the region of convergence.
   (a) $x(n) = e^{-3n}\,u(n-1)$.
   (b) $x(nT) = (nT)^2\,u(nT)$.

(4 × 10 = 40 marks)