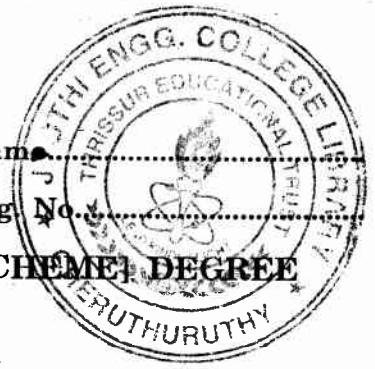


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Name

Reg. No.



**FIFTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE  
EXAMINATION, NOVEMBER 2015**

**CS/PTCS 09 503—SIGNAL PROCESSING**

Time : Three Hours

Maximum : 70 Marks

**Part A**

*Answer all questions.*

1. Define unit impulse function.
2. Check whether the discrete time signal,  $\sin 3n$  is periodic or not ?
3. List out of the Dirichlet's conditions of Fourier series.
4. State Parseval's relation for discrete time aperiodic signals.
5. What is the Z-transform of the sequence  $x(n) = a^n u(n)$  ?

(5 × 2 = 10 marks)

**Part B**

*Answer any four questions.*

6. Find whether the signal  $x(t) = 2 \cos(10t + 1) - \sin(4t - 1)$  is periodic or not ?
7. Determine the Laplace transform of the signal,

$$x(t) = \sin \pi t ; 0 < t < 1$$

$$= 0 \text{ otherwise}$$

8. Determine the Nyquist sampling rate and Nyquist sampling interval of the signal

$$x(t) = \sin c^2(200 \pi t)$$

9. Write the properties of ROC of Laplace transform.
10. Find the Z-transform of  $nU(n)$ .
11. Define LTI system. List out the properties of LTI system and explain.

(4 × 5 = 20 marks)

**Part C**

*Answer all questions.*

12. How are the signals classified ? Explain in detail.

Or

Turn over

13. Determine whether the following system is linear, time invariant, stable and invertible.

(i)  $y(n) = x^2(n)$ .

(ii)  $y(n) = x(-n)$ .

14. Find the Fourier transform of rectangular pulse. Sketch the signal and its Fourier transform.

*Or*

15. Find the Laplace transform of the signal  $x(t) = e^{-at} u(t) + e^{-bt} u(-t)$ .

16. State and prove sampling theorem for low-pass band limited signal and explain the process of reconstruction of the signal from its samples.

*Or*

17. What is aliasing ? Explain with an example.

18. Derive the necessary and sufficient condition for BIBO stability of an LSI system.

*Or*

19. Explain initial value and final value theorem in detail.

(4 × 10 = 40 marks)