

**B.TECH. DEGREE EXAMINATION, MAY 2014****Fourth Semester**

Branch : Applied Electronics and Instrumentation/Electronics and Communication/ Electronics and Instrumentation Engineering

AI 010 403/EC 010 403/EI 010 403—SIGNALS AND SYSTEMS (AI, EC, EI)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.  
Each question carries 3 marks.*

1. Define Energy and power?
2. State convolution properties in relation to Fourier transform ?
3. Define DTFT.
4. Compare Butterworth and Chebyshev filters.
5. Define region of convergence. What are the Properties of ROC ?

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.  
Each question carries 5 marks.*

6. Explain the classification of signal with examples.
7. Explain about Gibbs phenomenon.
8. State and prove the following properties of DTFT.
 

(i) Convolution ;	(ii) Correlation ;
(iii) Multiplication ;	(iv) Symmetry Property.
9. Write a short note on magnitude response of Butterworth filter.
10. Explain any two properties of Z-transform.

(5 × 5 = 25 marks)



Turn over

**Part C**

*Answer all questions.  
Each question carries 12 marks.*

11. Give the properties of convolution integral ?

*Or*

12. Find the natural and forced response of an LTI system given by

$$10 \frac{dy(t)}{dt} + 2y(t) = x(t)?$$

13. Find the Fourier transform given signal ;

(a) Square ;

(b) Triangular.

*Or*

14. Explain and derive convergence of Fourier series.

15. State and prove Parseval's theorem of DTFT, verify the same for the sequence :

$$x(n) = (0.5)^n u(n) ?$$

*Or*

16. Find the DTFT of  $x(n) = \{1, 1, 1, 1, 1, 1, 0, 0\}$ .

17. Describe about time domain characteristics of ideal LPF.

*Or*

18. Explain in detail with necessary mathematical derivations :

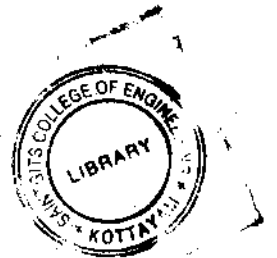
(a) Interpolation ;

(b) Aliasing.

19. Give the relationship between Z-transform and Fourier transform.

*Or*

20. Find the Z-transform of  $x(n) = a^n u(n)$  and for unit impulse signal.



(5 × 12 = 60 marks)