

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)