****

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**UNIVERSITY**

**Reg. No. \_\_\_\_\_\_\_\_**

**End Semester Examination – Nov / Dec – 2016**

**Subject Title: SIGNALS AND SYSTEMS Time : 3 hours**

**Subject Code: 11EC203 Maximum Marks: 100**

#### **Answer ALL questions**

**PART – A (10 x 1 = 10 MARKS)**

1. What do you mean by deterministic signal?

2. Define a discrete time system.

3. Differentiate Natural response and Forced response.

4. Find the Z-transform of x(n)={1,2,3}.

5. The Fourier series expansion of an odd periodic function contains \_\_\_\_\_\_\_\_\_\_\_ terms only.

6. Define Inverse Fourier Transform.

7. Nyquist sampling rate for a signal with maximum frequency of 10 KHz is \_\_\_\_\_\_\_\_\_\_\_ samples/sec.

8. What is Laplace transform of unit step function?

9. Discrete Fourier series of a periodic sequence x(n) is

10. The Fourier transform of δ(n – n0) is \_\_\_\_\_\_\_\_\_\_\_.

**PART – B (5 x 3 = 15 MARKS)**

11. Test whether the signal x(t) = 2cos (10t + 1) – sin(4t – 1) is periodic or not.

12. Find inverse Z-transform of 

13. State Dirchlet’s conditions for Fourier series.

14. What is meant by aliasing? What must be done to avoid aliasing?

15. Find DTFT of x(n)= u(n-k).

**PART – C (5 x 15 = 75 MARKS)**

16. a. Define the following signals. (3x3)

i. Unit impulse function.

ii. Energy signal.

iii. Power signal.

b. Sketch the following signals. (2x3)

i. -2u(t–1) ii. r(–t+2)

(OR)

17. Check whether the following systems are (a) Static or dynamic (b)Linear or non-linear

(c) Causal or non-causal (d) Time invariant or Time Variant (8+7)

i.  ii.

[P.T.O]

18. a. Determine the total response of the system



If the initial conditions are  and if the input is e-3t u(t) (10)

b. Obtain the Convolution of the sequence x(n) = u(n) – u(n – 7) and

h(n) = u(n – 1) – u(n – 4) (5)

(OR)

19. a. Find the z transform and its ROC of the function 

b. Find Z transform of x(n) = ( and find ROC. (5+10)

20. Find the cosine Fourier series of a half wave rectified sine function with amplitude of A

(OR)

21. a. Find the Fourier transform of the signal (8)



= 0 otherwise

b. State and prove time scaling and differentiation in time domain properties of Continuous Time Fourier Transform. (7)

22. Explain the process of reconstructing the original signal from its samples.

(OR)

23. a. Give Inverse Laplace Transform of the functions given below.

. (8)

b. Realize the transfer function of the system given in direct form I

H(s) = . (7)

24. Derive Linearity, Time shifting, Frequency shifting, Time reversal, Differentiation in frequency properties of discrete time Fourier transform. (4+4+3+4)

(OR)

25. Find the frequency response of the following causal systems.

a. y(n) = x(n) + x(n-1) +x(n-2) (8)

b. y(n) = y(n - 1) - y(n - 2) = x(n) + x(n - 1) (7)