**Code No. 2079**

## FACULTY OF INFORMATICS

**B.E. 2/4 (IT) II – Semester (Main) Examination, May 2013**

**Subject: Signals and Systems**

**Time: 3 Hours** **Max.Marks: 75**

***Note: Answer all questions from Part A. Answer any five questions from Part B.***

### *PART – A (25 Marks)*

1. Define 'signal' and 'system. (2)
2. A continuous-time signal x(ϵ) is shown in Figure (i). Plot x(2-t) and x(t/2). (3)

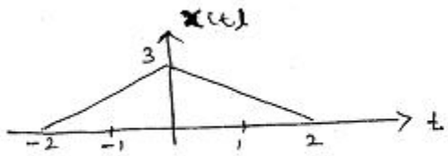


Figure (i)

3. Prove that if x(t) ↔ x(w) then x(at) ↔ $\frac{1}{|a|} x \left|\frac{w}{a}\right|$. (3)
4. Distinguish between energy and power signal. (2)
5. Draw a discrete signal and quantized signal. (2)
6. Plot the amplitude spectrum of x(ϵ) = 5 cos $2\pi$ (1K)t. (3)
7. Find z [$\delta$ ((n-4)] (3)
8. Plot $y_1$ = 4x(n) and $y_2$(n) = x (2n) for the x(n) shown in Figure (ii). (3)

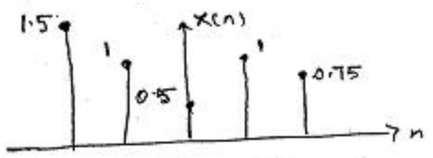


Figure (ii)

9. Distinguish between autocorrelation and cross correlation. (2)
10. Define two-sided z-transform. (2)

### PART – B (50 Marks)

11.(a) Define the following commonly use of functions
i) Unit step (ii) Signum (iii) sinc functions (6)

(b) State whether the signal x(ϵ) = $Ae^{3t}$ is a power signal or energy signal. Justify your answer. (4)

12.(a) Explain 3 different representations of Fourier Series. (5)

(b) Prove that $\delta$ (at) = $\frac{1}{|a|}$ $\delta$ (t). (5)

13.(a) Find the Fourier transform of the signals (6)
i) x(t) sin($w_o$t)
ii) x(t) = $\delta$ (t + $t_o$) + $\delta$ (t-$t_o$)

(b) Compare LT and FT. (4)

14. Find the solution of the following differential equation (10)
$\ddot{y}$(t) + 6 $\dot{y}$ + log (t) = x(t)
y(0) = 2 $\dot{y}$ (0) = 1.5 x(t) = (1-$e^{-3t}$)y(t)

…2.

15.(a) State and prove sampling theorem. (6)

(b) What is the function of ADC? (4)

16.(a) Determine the sequence y(n) if

$$y(z) = \frac{1}{z^2 - 1.5z + 0.2}$$ (7)

(b) What do you understand by BIBO stability? (3)

17. Write a MATLAB program

a) Fourier Series computation (5)

b) Scaling of discrete-time signals. (5)

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