Code No: R21044   **R10**   SET - 1

II B. Tech I Semester Supplementary Examinations, Dec - 2015
SIGNALS AND SYSTEMS
(Com. to ECE, EIE, ECC, BME)

Time: 3 hours   Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain about Liner time invariant and Linear time variant systems?   (7M)
    b) Show that the following systems are LTI or LTV systems?   (8M)
        i) $y(t) = x(t/2)$
        ii) $y(t) = x(t) + x(t - 2)$ for $t \geq 0$ and $'0'$ for $t \leq 0$

2. a) Differentiate Trigonometric Fourier series and exponential Fourier series.   (8M)
    b) Find the exponential Fourier series of a signal x(t) = cos 3t sin 4t   (7M)

3. a) State and prove the properties of Fourier transform   (7M)
    b) What is Gibbs phenomenon? Explain.   (8M)

4. a) Explain the characteristics of Ideal LPF, HPF and BPF   (7M)
    b) Explain about the characteristics of linear systems.   (8M)

5. a) Distinguish between Energy spectral density and power spectral density and   (7M)
        also State and Prove Parseval's theorem for energy signal?
    b) Find autocorrelation of the signal $x(t) = Acos(w_0 t + \theta)$ (8M)

6. a) Discuss the effect of under sampling a signal with example and neat diagrams. (7M)
    b) Explain how a signal is extracted from a noisy environment by using filtering (8M)
        technique

7. Determine the Laplace transform of the following   (15M)
    i) $x(t) = 2te^{-2|t|}$ ii) $x(t) = tcos(at)$ iii) $x(t) = e^{2t}u(-t) + e^{3t}u(t)$

8. a) State and prove the initial and final value theorems of Z-transforms   (7M)
    b) Find $x(\infty)$ using final value theorem, if $X(z)$ is given by   (8M)
        i) $\frac{z+1}{(z-0.6)^2}$ ii) $\frac{2z+3}{(z+1)(z+3)(z-1)}$