

An AUTONOMOUS Institution

**Question Paper Code:** 

EC304PC

ACE-R20

## Semester Supplementary Examination II B. Tech- I Semester- SEPTEMBER-2022

## Signals And Systems

(Electronics & Communication Engineering )

Max. Marks: 70

H. T. No			

Answer any 5 Questions out of 8 Questions from the following

Question

1. a) Derive the expression for mean square error.  b) Verify the signal is energy or power signal $x(t) = 2\cos 4t$ 2. a) Write properties of impulse function.  b) State and Prove the Parseval's Theorem in Continuous Time Fourier Transform.  3. a) Calculate the convolution between the signals $x(n) = \{-3, -\frac{1}{2}, 1, 4\}$ and $h(n) = \{-2, 4, \frac{3}{3}, 2\}$ b) Differentiate signal bandwidth and system bandwidth.  4. a) Sketch the signal $x(t) = t^2$ for all t and find the Trigonometric Fourier Series and the frequency spectrum of the signal over the interval $(-1,1)$ .  b) Explain the causality and Paley-Wiener criterion for physical realization.  4. b) State and prove the following Fourier transform properties. i) Time shifting ii) Time scaling.  6. a) What is the relationship between Laplace and Fourier transforms.  7. c) Find the Inverse Laplace Transform of $X(s) = \frac{2}{(s+2)(s+3)}$ , $ROC: -3 < Re\{s\} < -2$ 7. a) How to detect periodic signals in the presence of noise using correlation.  4. b) Derive the relation between Autocorrelation and Energy/Power spectral density function  8. a) Determine the autocorrelation function of $x(t) = e^{-at}u(t)$ b) State and prove sampling theorem for band limited signals.	Q.No	Question	Marks
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