ACE Engineering College
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Question Paper Code: EC304PC | ACE-R20

Semester Supplementary Examination
II B. Tech- I Semester- SEPTEMBER-2022
Signals And Systems
(Electronics & Communication Engineering)

Time: 3 Hours **Max. Marks: 70**

H. T. No										

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks
1. a)	Derive the expression for mean square error.	7
b)	Verify the signal is energy or power signal $x(t) = 2\cos 4t$	7
2. a)	Write properties of impulse function.	6
b)	State and Prove the Parseval's Theorem in Continuous Time Fourier Transform.	8
3. a)	Calculate the convolution between the signals $x(n) = \{-3, \underset{\uparrow}{-2}, 1, 4\}$ and $h(n) = \{-2, 4, \underset{\uparrow}{3}, 2\}$	10
b)	Differentiate signal bandwidth and system bandwidth.	4
4. a)	Sketch the signal $\mathbf{x(t)=t^2}$ for all t and find the Trigonometric Fourier Series and the frequency spectrum of the signal over the interval (-1,1).	10
b)	Explain the causality and Paley-Wiener criterion for physical realization.	4
5. a)	How to find the Fourier transform of periodic signals. Explain with an example.	7
b)	State and prove the following Fourier transform properties. i) Time shifting ii) Time scaling.	7
6. a)	What is the relationship between Laplace and Fourier transforms.	7
b)	Find the Inverse Laplace Transform of $X(s) = \frac{2}{(s+2)(s+3)}, ROC: -3 < \mathrm{Re}\{s\} < -2$	7
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	10
8. a)	Determine the autocorrelation function of $x(t) = e^{-at}u(t)$	4
b)	State and prove sampling theorem for band limited signals.	10