

Exam.Code:0936
Sub. Code: 6676 ✓

2054
B.E. (Electrical and Electronics Engineering)
Sixth Semester
PC-EE-604: Signals and Systems ✓

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

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Q.1a)	What is the significance of Hilbert transform in communication systems?	(5×2)
b)	Differentiate between odd and even signals.	
c)	What is a Dirac delta function? Enlist its properties.	
d)	Establish the relation between the Unit step and Unit impulse signals.	
e)	State the condition for convergence of Fourier Series.	
Section A		
Q.2a)	A Discrete Time system is described by the difference equation $y[n] + 0.1 y[n-1] - 0.2 y[n-2] = x[n] + x[n-1]$. Find the impulse response of the system.	(4)
b)	Define the term system. Differentiate causal and non-causal systems	(3)
c)	State and prove the time shifting property of a system.	(3)
Q.3a)	Determine whether the following function is periodic or not. If so find the period. $x(t) = 3\sin 200\pi t + 4\cos 100t$.	(5)
b)	What is an LTI system? Explain its properties. Derive an expression for the Transfer function of an LTI system.	(5)
Q.4a)	Find the Fourier series coefficients for the following signal, $x(t) = 1 + \cos(2\pi t)$	(5)
b)	Explain Parseval's theorem for energy and power signals	(5)
Section B		
Q.5	State and prove sampling theorem for Band limited Signals. What is meant by aliasing?	(10)
Q.6a)	State and prove the following property of Fourier transform: Differentiation, Scaling	(5)
b)	Given that $x(n)$ has Fourier transform $X(e^{j\omega})$, express the Fourier transform of the following signals in terms of $X(e^{j\omega})$: $y(n) = x(1-n) + x(-1-n)$	(5)
Q.7a)	Compute the discrete-time Fourier transform of the following signal. $x[n] = (1/4)^n u[n]$	(6)
b)	What is the difference between the continuous time signals and analog signals? Discuss with examples.	(4)