Exam.Code:0936
Sub. Code: 6642

2014

B.E. (Electrical and Electronics Engineering)

Sixth Semester

EE-612: Signal and Systems

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

Q.1a)	State the conditions for the ROC of causal and stable system function H(z).	(2×5)
b)	Explain when the system said to be memory less with an example.	
c)	Relate the impulse signal, step signal, ramp signal.	
d)	Distinguish between continuous time and analog signals.	
e)	What is Hilbert Transform? Write its mathematical expression.	
	Section A	
Q.2a)	Determine the ROC of the given signal x[n] = (1/4) n u[n+4].	(4)
b)	Differentiate between power and energy signals.	(3)
c)	State the Dirichlet's conditions for the Fourier transform to exist?	(3)
Q.3a)	Compute the Fourier transform of the signal, $x(t)=e^{-t}u(t)$.	(4)
b)	State and prove the following properties of continuous time Fourier transform: Scaling, Convolution.	(3)
c)	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.	(3)
Q.4a)	State and prove sampling theorem. What is the Nyquist sampling rate.	(4)
b)	Find the constant a_0 of the Fourier series for function f (x) = x in $0 \leq x \leq 2\pi$.	(3)
c)	What the Parseval's identity in context with the Fourier Transform. Discuss mathematically.	(3)
	Section B	
Q.5a)	Find the DTFS coefficients of the following DT periodic signal and plot the magnitude and phase spectrum. $x(n) = \sum_{K=-\infty}^{\infty} \delta(n - 8k)$	(5)
b)	Determine the causal signal $x(n)$ having the z-transform using partial fraction method $X(z) = \frac{1}{(1+z^{-1})(1-z^{-1})^2}$	(5)
Q.6a)	Find the time signal corresponding to the following Laplace transform: $X(s) = \frac{4s^2 + 8s + 10}{(s+2)(s^2+2s+5)}$	(5)
b)	Determine the causal signal $x(n)$ having the z-transform using partial fraction method $X(z) = \frac{1}{(1+z^{-1})(1-z^{-1})^2}$	(5)
Q.7a)	State and prove the following property of z-transform: Differentiation, Scaling	(4)
b)	State and prove the duality property of DFT.	(3)
c)	Enlist four properties of ROC of Laplace Transform. Discuss with suitable examples.	(3)

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