C.O.E.P

ELECTRICAL ENGINEERING DEPARTMENT

END SEMESTER EXAM (2013-14)

Signal Processing [EE-09005]

Branch: Electrical | **Total: 60 Marks**

S.Y.B.Tech | **Time: 3:00 hr**

Note: (i) All questions are compulsory

Q.1	A.	Consider the Discrete –Time signal $$x[n] = 1 - \sum_{k=3}^{\infty} \delta[n-1-k]$$ Determine the value of the integers M and n_0 so that $x[n]$ may be expressed as $x[n] = u[Mn - n_0]$	5 Marks
	B.	Explain the representation of discrete–time signals in terms of Impulses.	3 Marks
	C.	Explain the properties of Linear-Time Invariant systems.	4 Marks
Q.2	A.	Calculate and draw the convolution of two signals given below (assuming $\alpha > 1$) $$x[n] = \begin{cases} 1, & 0 \le n \le 4 \\ 0, & \text{otherwise.} \end{cases}$$ $$h[n] = \begin{cases} \alpha^n, & 0 \le n \le 6 \\ 0, & \text{otherwise} \end{cases}$$	5 Marks
	B.	Draw the amplitude and phase spectrum of the Fourier coefficients of the signal given below $$x(t) = 1 + \sin\omega_0 t + 2\cos\omega_0 t + \cos\left(2\omega_0 t + \frac{\pi}{4}\right)$$	5 Marks
Q.3	A.	Explain the representation of continuous-time **aperiodic** signals with Fourier Transform (take continuous-time periodic square wave for explanation).	4 Marks
	B.	Explain the Parseval,s relation in Continuous-time Fourier Trasform	3 Marks
	C.	Explain the convergence issues associated with the Discrete-time Fourier transorm.	4 Marks
Q.4	A.	Consider a signal that is sum of a real and a complex exponential $$x(t) = e^{-2t}u(t) + e^{-t}(\cos 3t)u(t)$$ Find the Laplace transformation and Draw the ROC.	5 Marks
	B.	Explain the Sampling theorem with an example.	4 Marks
	C.	Explain Aliasing	4 Marks

Q.5	A.	Explain the properties of the region of convergence for z- transform.	4 Marks
	B.	Consider the signal $$x[n]=\left(\frac{1}{3}\right)^{n}\sin\left(\frac{\pi}{4}n\right)u[n]$$ Find the z-transform of the signal and draw the ROC.	5 Marks
	C.	Consider the z-transform $$X(z)=\frac{3-\frac{5}{6}z^{-1}}{(1-\frac{1}{4}z^{-1})(1-\frac{1}{3}z^{-1})},\lvert z\rvert>\frac{1}{3}$$ Determine the Inverse z-transform.	5 Marks