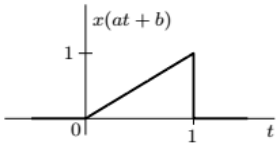
Digital Signal Processing
(EE41013/EE60033)

Class Test 1

Total Marks: 15 Time: 1 hour

Q1. (a) Using $x(\mathrm{at}+b)$ shown below in the Fig. plot $x(t)$ for $a=2, b=-1$



(2)

(b) Plot the convolution $y[n]=h[n]\star x[n]$ where $x[n]=u[n]-u[n-4]$ and $h[n]=\delta[n]-\delta[n-2]$

(3)

Q2. (a) Show that the accumulator $h(n)=\sum_{k=-\infty}^{n}\delta(k)$ and the backward difference systems are inverse of each other.

(2)

(b) Prove that the accumulator is a time-invariant system

(3)

Q3. Plot the signal $x(n)=K\alpha^{|n|}$, $\alpha\in\mathbb{R}$, for $\alpha>1$ and $\alpha<1$.

Derive the expression for the Z-transform of $x(n)$ and its ROC.

(5)