

# CARLETON UNIVERSITY

Department of Systems and Computer Engineering

SYSC 5608 Wireless Communications Systems Engineering

Winter 2016

Professor H. Yanikomeroglu

QUIZ 2

19 January 2016

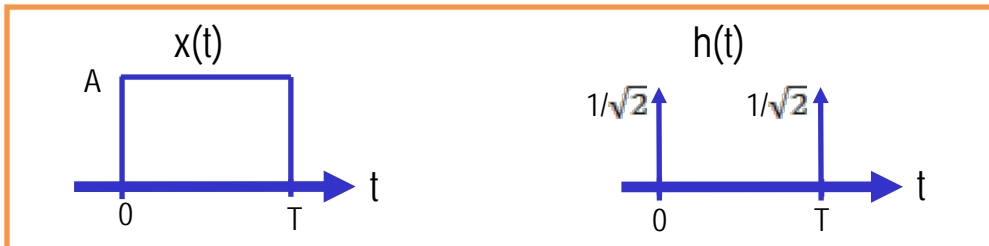
Name:

Student #:

E-mail:

---

**Q1. Convolution:** In the below,  $x(t)$  is the input to a linear time-invariant (LTI) channel with impulse response  $h(t)$ . Sketch the output  $y(t)$ . Is this an ideal channel (substantiate your answer)?



**Q2.** Consider an LTI channel with impulse response  $h(t)$ . The input and output of the channel are denoted by  $x(t)$  and  $y(t)$ , respectively. The corresponding Fourier Transforms are  $H(f)$ ,  $X(f)$ , and  $Y(f)$ , respectively. Write the output in terms of the input and channel

- in time domain,
- in frequency domain.

If the input to this LTI system is a random process,  $X(t)$ , with a power spectral density (PSD) of  $S_X(f)$ , write the PSD for the output process  $Y(t)$ .

**Q3.** Sketch the signal constellation for 16 QAM.