Name ______________________________ CM_______________

ECE-300, Quiz #3

1) The integral $\int_{-\infty}^{\infty} u(t+1)u(t-2)t^2 dt$ can be simplified as

a) $\int_{-1}^{\infty} t^2 dt$ b) $\int_{2}^{\infty} t^2 dt$ c) $\int_{-1}^{2} t^2 dt$ d) none of these

2) The integral $\int_{-\infty}^{\infty} u(-1-\lambda)\lambda^2 d\lambda$ can be simplified as

a) $\int_{-\infty}^{-1} \lambda^2 d\lambda$ b) $\int_{-1}^{\infty} \lambda^2 d\lambda$ c) $\int_{1}^{\infty} \lambda^2 d\lambda$ d) none of these

3) The integral $\int_{-\infty}^{\infty} u(t-\lambda-1)\delta(\lambda+1)d\lambda$ can be simplified as

a) 1 b) 0 c) $u(t)$ d) $u(t-2)$

4) Assume that at some point in determining the convolution of two functions we end up with an integral of the following form

$$\int_{-2}^{t-1} \ldots d\lambda$$

Once we have evaluated this integral, we need to append which of the following functions to indicate that the integral is only nonzero for a certain range of t

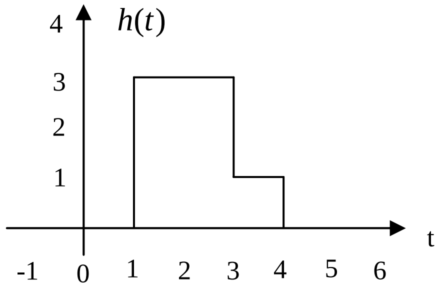
a) $u(t)$ b) $u(t-1)$ c) $u(t+2)$ d) $u(t+1)$ e) $u(t-3)$

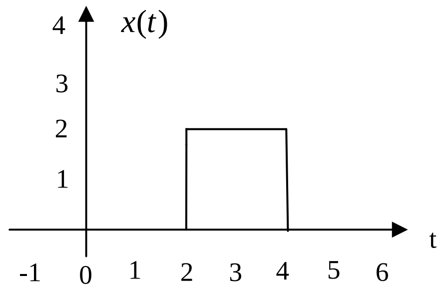
5) The integral $\int_{-\infty}^{\infty} \delta(t-\lambda)\delta(\lambda-1)d\lambda$ can be simplified as

a) 0 b) 1 c) $\delta(t-1)$ d) $\delta(t+1)$

Continued on the back…

6) Consider the following linear time invariant (LTI) system, with impulse response $h(t)$ shown below on the left, and input $x(t)$ shown below on the right. The output of the system, $y(t)$, is the convolution of the impulse response with the input, $y(t) = h(t) * x(t)$.





Is this LTI system causal? a) Yes b) No

In Problems 7-10, consider the system modeled by the equation

$$y(t) = x\left(\frac{t}{2}\right), \; 0 < t < \infty$$

7) Is the model linear? a) Yes b) No

8) Is the model time-invariant? a) Yes b) No

9) Is the model memoryless? a) Yes b) No

10) Is the model causal? a) Yes b) No

11) The **unit step response** of a system is $s(t) = e^{-t}u(t)$. The **impulse response** of this system is

a) $h(t) = -e^{-t}u(t)$ b) $h(t) = -e^{-t}u(t) + \delta(t)$ c) $h(t) = -e^{-t}u(t) + e^{-t}$ d) $h(t) = -te^{-t}u(t)$