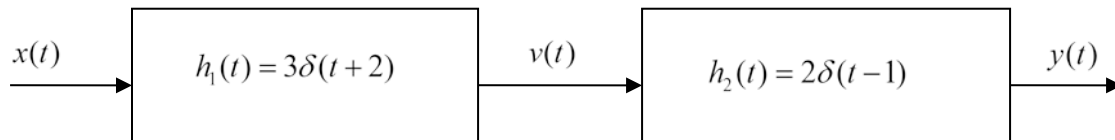


Name \_\_\_\_\_ CM \_\_\_\_\_

### ECE-205 Quiz 6

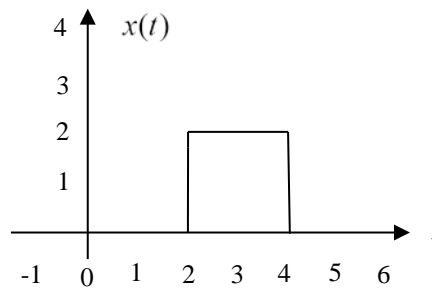
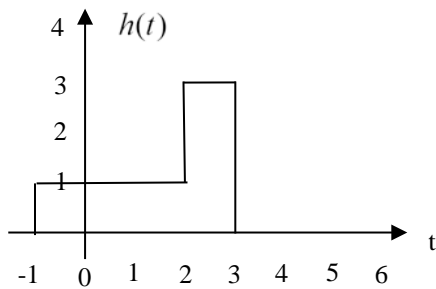
1) The **impulse response** of the system



is

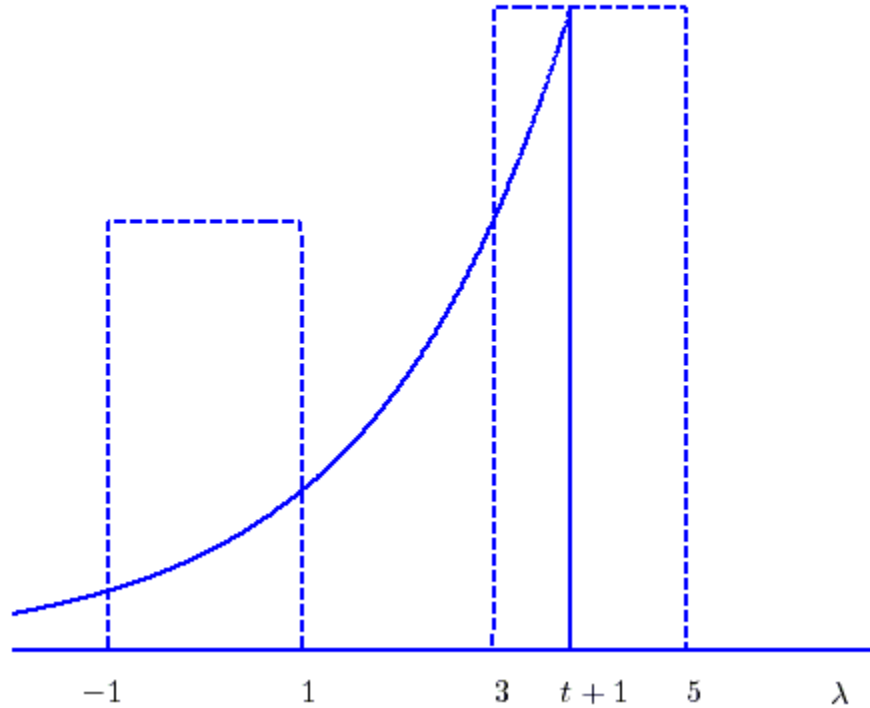
- a)  $h(t) = 6u(t)$    b)  $h(t) = 6u(t-1)$    c)  $h(t) = 6u(t+1)$   
 d)  $h(t) = 6\delta(t)$    e) none of these

Problems 2 - 5 refer to 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,  $y(t) = h(t) * x(t)$ .



- 2) Is this LTI system causal?                      a) Yes   b) No
- 3) The maximum value of  $y(t)$  is                      a) 4   b) 5   c) 6   d) 7   e) 8
- 4)  $y(t)$  is zero until what time?                      a) 0   b) 1   c) 2   d) 3   e) 4
- 5)  $y(t)$  will return to zero at what time?                      a) 6   b) 7   c) 8   d) 9   e) 10

For problems **6-11**, assume we are convolving two functions, and at some point we have the configuration shown below:



The output at this time can be written as the sum of two integrals,

$$y(t) = \int_a^b x(\lambda)h(t-\lambda)d\lambda + \int_c^d x(\lambda)h(t-\lambda)d\lambda$$

- 6)** The value of the parameter  $a$  is a) -1 b) 1 c) 3 d) 5 e)  $t$  f)  $t+1$
- 7)** The value of the parameter  $b$  is a) -1 b) 1 c) 3 d) 5 e)  $t$  f)  $t+1$
- 8)** The value of the parameter  $c$  is a) -1 b) 1 c) 3 d) 5 e)  $t$  f)  $t+1$
- 9)** The value of the parameter  $d$  is a) -1 b) 1 c) 3 d) 5 e)  $t$  f)  $t+1$
- 10)** This sketch is valid for  
a)  $-1 < t < 1$  b)  $3 < t < 5$  c)  $0 < t < 2$  d)  $0 < t < 1$  e) none of these
- 11)** Is this a causal system? a) yes b) no c) it is not possible to tell

12) An LTI system has impulse response, input, and output as shown below. Determine numerical values for the parameters  $a$ ,  $b$ ,  $c$ ,  $d$  and  $e$ . Note that the diagram is not to scale!

