CARLETON UNIVERSITY

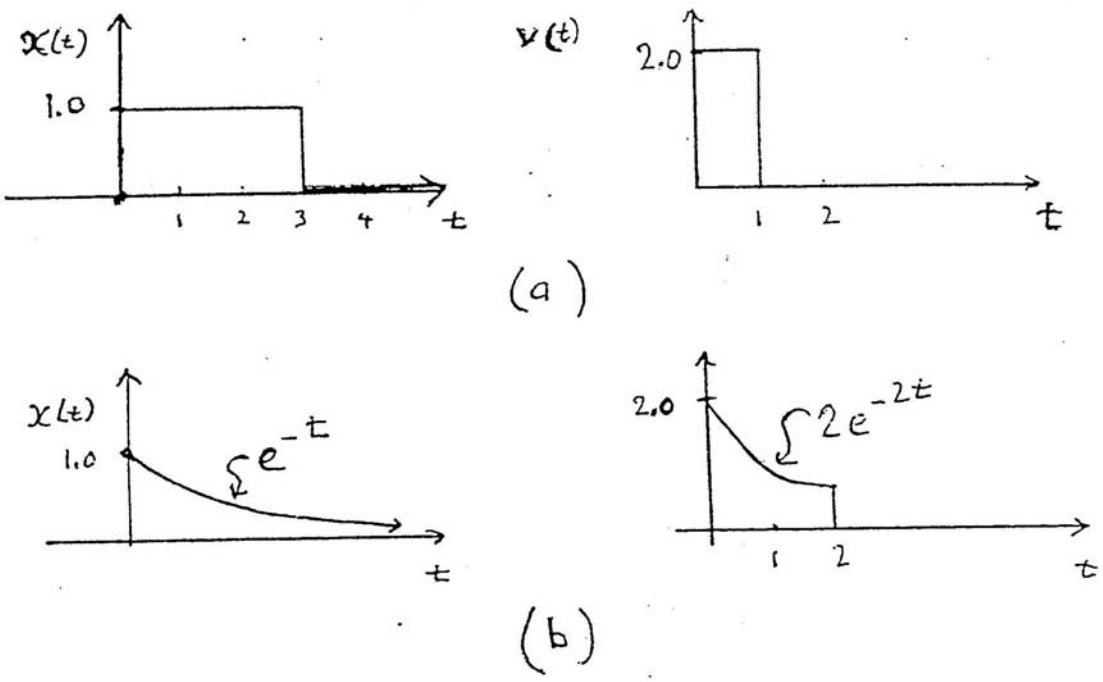
Department of Systems and Computer Engineering

SYSC3600 Systems and Simulation Fall 2021

Assignment #2

Due Date: Thursday, October 21, 2021

1. Convolve the following signals:

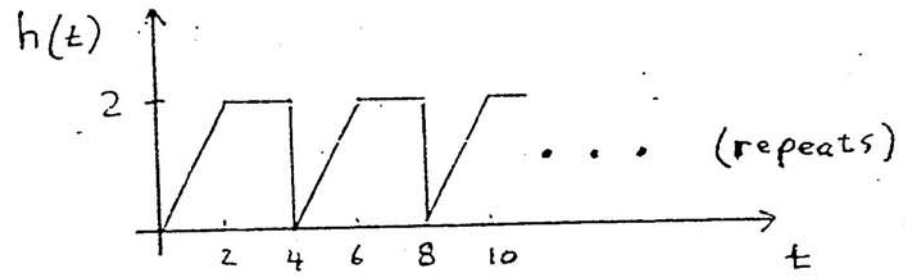


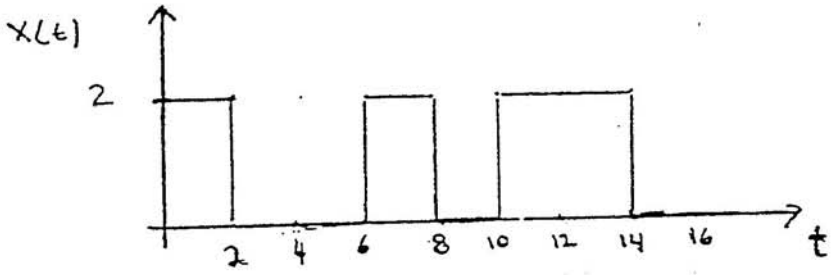
2. Give the following LTI system with its impulse reponse,

$$h(t) = e^{-t} + \cos t, t \geq 0$$

- what is the step response?
- when the input is $u(t) - u(t-2)$, what is the output?

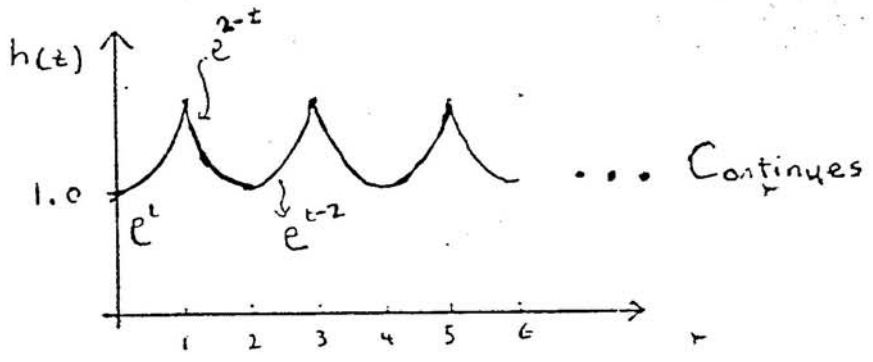
3. A system has the following impulse response.



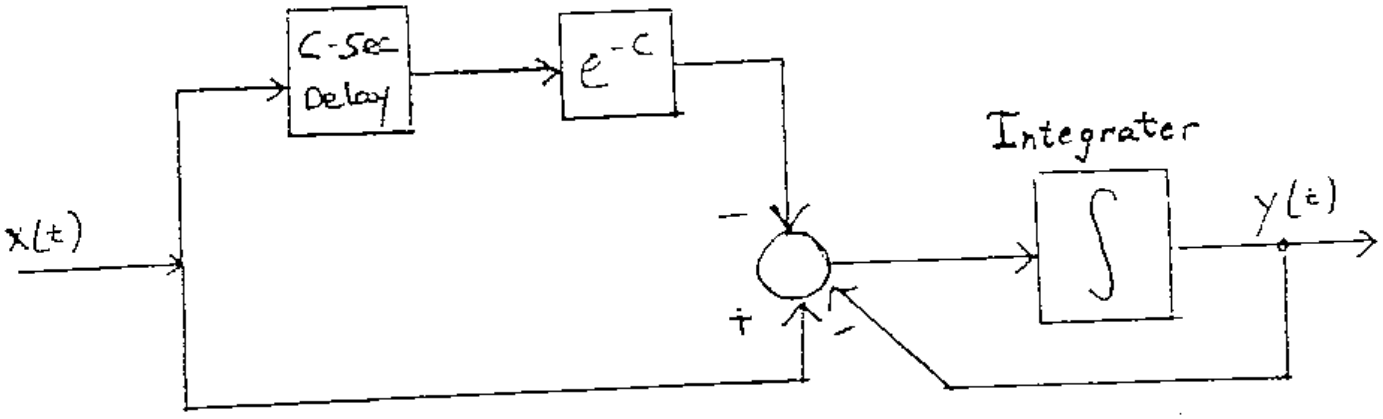


For the input given by x(t), compute the output y(t) for $4 \leq t \leq 6$ only.

4. A system has an impulse response, h(t), as shown below. Compute the system output, y(t), for $0 \leq t \leq 2$, if the input is $x(t) = 2e^{-t}\,[u(t) - u(t-1)]$, u(t) is the unit step.



5. For the system shown below,



a) Compute the unit impulse response h(t).
b) Given the input is $x(t) = e^{-2t}$, $t \geq 0$, find the output y(t).

Hint: for a system gonverned by a differential equation $\dot{y}(t) + y(t) = x(t)$, in which $x(t)$ and $y(t)$ are input and output, respectively, the unit impulse response is $h(t) = e^{-t}, t \geq 0$