Name _____ Answers _____

# EE3032 – Dr. Durant – Quiz 3
Winter 2019-2020, Week 3

1. (1 point) Given impulse response $h(t) = r(t) - r(t-1) - u(t-2)$, sketch $h(\tau)$. Label the horizontal axis with the variable τ.
2. (2 points) Find the energy, E, of h by integrating h^2.
3. (1 point) Sketch $h(-\tau)$. Label the horizontal axis with the variable τ.
4. (2 points) Sketch $h(t-\tau)$. For the case t=1.5. Label the horizontal axis with the variable τ.
5. (1 point) Given the input function $x(\tau) = u(\tau-1)$, sketch $x(\tau)$.
6. (2 points) Sketch the product function, $h(t-\tau) \, x(\tau)$ for t=1.5.
7. (1 point) Calculate the area of the product function you just sketched. This is y(1.5).

①
$h(\tau)$
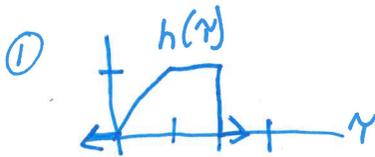
② $E = \int_0^2 h^2(t)\,dt = \int_0^1 t^2\,dt + \int_1^2 1\,dt$

$= \frac{t^3}{3}\Big|_0^1 + 1 = \boxed{\tfrac{1}{3}}$

③
$h(-\tau)$

④
$h(t-\tau)$ ⟶ t=1.5

⑤
$x(\tau)$

⑥
(1, 0.5)
(1.5, 0)
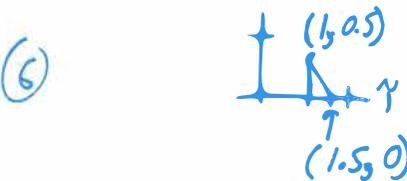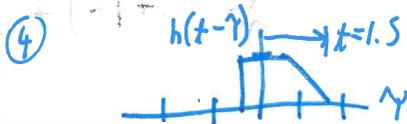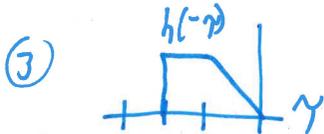
⑦ $A = \frac{1}{2}bh = \frac{1}{2}\cdot(1.5-1)\cdot(0.5-0) = \frac{1}{2}\cdot 0.5 \cdot 0.5 = \boxed{0.125 = y(1.5)}$