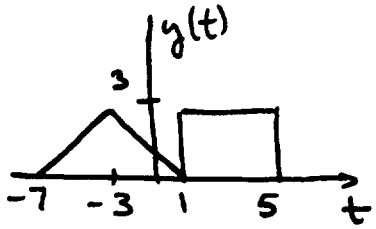
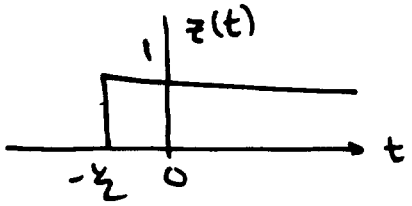
GEORGIA INSTITUTE OF TECHNOLOGY
SCHOOL OF ECE
EE 3230
SOLUTIONS TO QUIZ # 1

(1) (a)



(b) $z(t) = x(-\frac{1}{2}) \int_{-\infty}^{t} \delta(\tau + \frac{1}{2})\, d\tau = \begin{cases} x(-\frac{1}{2}), & t > -\frac{1}{2} \\ 0, & t < -\frac{1}{2} \end{cases} = u(t+\frac{1}{2})$

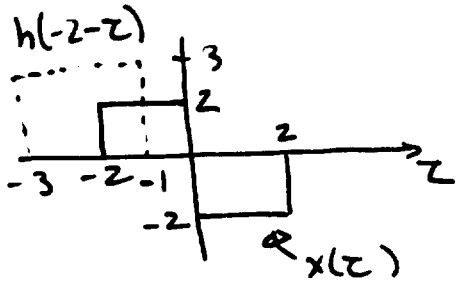


(2)

	System I	System II
Memoryless	NO	NO
Causal	NO	NO
Stable	YES	YES
Linear	YES	YES
Time-Invariant	NO	NO

(3) (a)
$t < -3$
$-3 < t < -1$
$-1 < t < 1$
$1 < t < 3$
$t > 3$

(b)



$\Rightarrow y(-2) = \int_{-2}^{-1} 6\, d\tau = \underline{6}$

(4) (a) $h(t) = \frac{1}{2\pi}\int_{-4}^{-2} 2e^{j\omega t}\,d\omega + \frac{1}{2\pi}\int_{2}^{4} 2e^{j\omega t}\,d\omega = \frac{1}{\pi j t}\left[e^{-j2t} - e^{-j4t} + e^{j4t} - e^{j2t}\right]$

$= \frac{1}{\pi j t}\left\{e^{-j3t}\left(e^{jt} - e^{-jt}\right) + e^{j3t}\left(e^{jt} - e^{-jt}\right)\right\}$

$= \frac{4}{\pi}\cos(3t)\cdot\frac{\sin(t)}{t} \quad \Rightarrow a = \frac{4}{\pi},\ b = 3,\ c = 1$

(b) $y(t) = H(0)\cdot 1 + H(-j\pi)\,\frac{1}{2}e^{-j\pi t} + H(j\pi)\,\frac{1}{2}e^{j\pi t}$

$= 2\cos(\pi t)$

(5) (a) False
(b) False
(c) True
(d) True
(e) True