

### Practice Quiz 3

(no calculators allowed)

**1)** Fill in the following table with a Y (yes) or N (no) for each of the system models given.  
Assume  $-\infty < t < \infty$  for all of the systems.

System	System Model	Linear?	Time-Invariant?	Causal?	Memoryless?
A	$y(t) = 3\sin(t+1)x(t-1)$				
B	$y(t) = x\left(\frac{t}{2} - 1\right)$				
C	$y(t) = x(1-t)$				
D	$\dot{y}(t) + t^2 y(t) = \sin(t)x(t)$				
E	$y(t) = \int_{-\infty}^t e^{-(t-\lambda)} x(\lambda + 1) d\lambda$				

**2)** The **average power** in the signal  $x(t) = ce^{j\omega_0 t}$  is

- a) 0    b)  $\frac{|c|}{2}$     c)  $|c|^2$     d)  $\frac{|c|^2}{2}$

**3)** The **average power** in the signal  $x(t) = A \cos(\omega_0 t + \theta)$  is

- a)  $\frac{|A|}{2}$     b)  $|A|$     c)  $A^2$     d)  $\frac{A^2}{2}$

**4)** The **average power** in the signal  $x(t) = ce^{j\omega_0 t} + de^{j2\omega_0 t}$  is

- a) 0    b)  $\frac{|c|}{2} + \frac{|d|}{2}$     c)  $|c|^2 + |d|^2$     d)  $\frac{|c|^2}{2} + \frac{|d|^2}{2}$

**5)** The **average power** in the signal  $x(t) = A \cos(\omega_0 t + \theta) + B \cos(2\omega_0 t + \phi)$  is

- a)  $\frac{|A|}{2} + \frac{|B|}{2}$     b)  $|A| + |B|$     c)  $A^2 + B^2$     d)  $\frac{A^2}{2} + \frac{B^2}{2}$

**6)** The signal  $x(t) = e^{-t} \cos(t)u(t)$  is

- a) an energy signal    b) a power signal    c) neither energy or power

**7)** The signal  $x(t) = \cos(t)[u(t) - u(t-10)]$  is

- a) an energy signal    b) a power signal    c) neither energy or power

**8)** The integral  $h(t) = \int_{-\infty}^{t+1} e^{-(t-\lambda)} \delta(\lambda+3) d\lambda$  can be simplified as

- a)  $e^{-(t+3)} u(t)$     b)  $e^{-(t+3)} u(t+1)$     c)  $e^{-(t+3)} u(t+3)$     d)  $e^{-(t+3)} u(t+4)$

**9)** The integral  $h(t) = \int_{-\infty}^{t-3} e^{-(t-\lambda)} \delta(\lambda-1) d\lambda$  can be simplified as

- a)  $e^{-(t-1)} u(t)$     b)  $e^{-(t-1)} u(t-1)$     c)  $e^{-(t-1)} u(t-3)$     d)  $e^{-(t-1)} u(t-4)$

**10)** The integral  $h(t) = \int_{-t+2}^5 e^{-(t-\lambda)} \delta(\lambda-3) d\lambda$  can be simplified as

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

**11)** If  $z_1 = \frac{1-j}{1+j}$  and  $z_2 = \frac{1}{1+j}$ , then the **magnitude** of  $z = z_1 z_2$ ,  $|z|$ , is equal to

- a)  $\frac{1}{\sqrt{2}}$     b)  $\sqrt{2}$     c) 1    d) none of these

**12)** If  $z_1 = \frac{1-j}{1+j}$  and  $z_2 = \frac{1}{1+j}$ , then the **phase** of  $z = z_1 z_2$ ,  $\angle z$ , is equal to

- a)  $0^\circ$     b)  $45^\circ$     c)  $-45^\circ$     d)  $135^\circ$     e)  $-135^\circ$     f) none of these

**13)** If  $z_1 = \frac{2-j}{1+3j}$  and  $z_2 = \frac{3+j}{2+j}$ , then the **magnitude** of  $z = z_1 z_2$ ,  $|z|$ , is equal to

- a)  $\sqrt{\frac{4}{5}}$     b)  $\sqrt{2}$     c) 1    d) none of these

**14)** If  $z_1 = \frac{j}{1+j}$  and  $z_2 = \frac{1}{1-j}$ , then the **phase** of  $z = z_1 z_2$ ,  $\angle z$ , is equal to

- a)  $0^\circ$     b)  $45^\circ$     c)  $-45^\circ$     d)  $135^\circ$     e)  $-135^\circ$     f) none of these

**Answers:** 1) A--Y,N,Y,N    B--Y,N,N,N    C--Y,N,N,,N    D--Y,N,Y,N    E--Y,Y,N,N

2) c    3) d    4) c    5) d    6) a    7)a    8)d    9)d    10)b

11)a    12)e    13)c    14)f ( $\angle z = 90^\circ$ )