

## ECE-300, Quiz #2

1) The average power in the signal  $x(t) = ce^{j\omega t}$  is

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

2) The average power in the signal  $x(t) = A \cos(\omega t + \theta)$  is

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

3) The signal  $x(t) = A \cos(\omega t)[u(t) - u(t-10)]$  is

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

4) The function  $x(t) = 2 \cos(2t) + j2 \sin(2t)$  is

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

5) The function  $x(t) = 2u(t) - u(t-1) - 2u(t-2)$  is

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

6) The function  $x(t) = e^t u(t)$  is

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

7) The function  $x(t) = e^{j\frac{t}{4}} + e^{j\frac{t}{2}}$  is

- a) not periodic  
b) periodic with fundamental period  $\pi$  second  
c) periodic with fundamental period  $2\pi$  seconds  
d) periodic with fundamental period  $8\pi$  seconds

8) The function  $x(t) = \cos(t) + \sin(2\pi t)$  is

- a) not periodic  
b) periodic with fundamental period 1 second  
c) periodic with fundamental period  $\pi$  seconds  
d) periodic with fundamental period  $2\pi$  seconds

9) Assume  $x(t) = 3\cos(4t + 3)$  (note that 3 is in radians, not degrees) is the input to a system with transfer function

$$H(j\omega) = 3e^{j2\omega}$$

In steady state the output of the system will be

- a)  $y(t) = 9\cos(4t + 3)e^{j8}$    b)  $y(t) = 9\cos(4t - 5)$    c)  $y(t) = 9\cos(4t + 11)$    d) none of these

For problems 10-13 consider the following mathematical model of a system

$$y(t) = 3\sin(t+1)x(t-1)$$

- 10) Is this model **linear**?                      a) Yes   b) No  
11) Is this model **time-invariant**?           a) Yes   b) No  
12) Is this model **causal**?                    a) Yes   b) No  
13) Is this model **memoryless**?            a) Yes   b) No

For problems 14-17 consider the following mathematical model of a system

$$y(t) = x\left(\frac{t}{2} - 1\right)$$

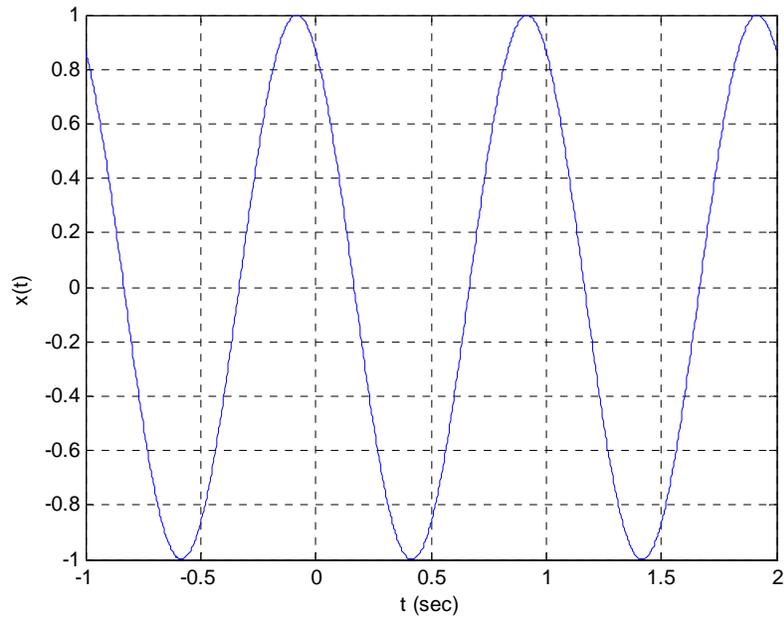
- 14) Is this model **linear**?                      a) Yes   b) No  
15) Is this model **time-invariant**?           a) Yes   b) No  
16) Is this model **causal**?                    a) Yes   b) No  
17) Is this model **memoryless**?            a) Yes   b) No

For problems 18-21 consider the following mathematical model of a system

$$y(t) = x(1-t)$$

- 18) Is this model **linear**?                      a) Yes   b) No  
19) Is this model **time-invariant**?           a) Yes   b) No  
20) Is this model **causal**?                    a) Yes   b) No  
21) Is this model **memoryless**?            a) Yes   b) No

22) The following figure shows the plot of  $x(t) = A\cos(\omega t + \theta)$ .



Assume we know  $-90^\circ < \theta < 90^\circ$ . Based on the plot, which of the following is the most accurate conclusion:

- a)  $\theta < 0$     b)  $\theta > 0$     c) we can conclude nothing about  $\theta$