Name _____ CM_____

ECE-300, Quiz #4

1) We can write $e^{jk\pi}$ as a) 1 b) $(-1)^k$ c) 0

2) We can write j as a) $e^{j\pi}$ b) $e^{-j\pi}$ c) $e^{j\frac{\pi}{2}}$ d) $e^{-j\frac{\pi}{2}}$

3) We can write -1 as (circle all that apply) a) $e^{j\pi}$ b) $e^{-j\pi}$ c) $e^{j\frac{\pi}{2}}$ d) $e^{-j\frac{\pi}{2}}$

4) We can write $\cos(\theta)$ as

a) $\frac{e^{j\theta}-e^{-j\theta}}{2}$ b) $\frac{e^{j\theta}-e^{-j\theta}}{2j}$ c) $\frac{e^{j\theta}+e^{-j\theta}}{2j}$ d) $\frac{e^{j\theta}+e^{-j\theta}}{2}$

5) We can write $\sin(\theta)$ as

a) $\frac{e^{j\theta}-e^{-j\theta}}{2}$ b) $\frac{e^{j\theta}-e^{-j\theta}}{2j}$ c) $\frac{e^{j\theta}+e^{-j\theta}}{2j}$ d) $\frac{e^{j\theta}+e^{-j\theta}}{2}$

6) Assume we are going to synthesize a periodic signal $x(t)$ using $x(t)=\sum c_k e^{jk\omega_0 t}$ where $c_k=\frac{j}{1+k^2}$. Will $x(t)$ be a real function?

a) Yes b) No

7) Assume we are going to synthesize a periodic signal $x(t)$ using $x(t)=\sum c_k e^{jk\omega_0 t}$ where $c_k=\frac{jk}{1+jk}$. Will $x(t)$ be a real function?

a) Yes b) No

8) Assume $x(t)=2\cos(3t)$ is the input to system with transfer function $H(j\omega)=2e^{-j\omega}$. In steady state the output of the system will be

a) $y(t)=4\cos(3t)e^{-j\omega}$ b) $y(t)=4\cos(3t)e^{-j3}$ c) $y(t)=4\cos(3t-3)$
d) $y(t)=4\cos(3t+3)$ e) none of these

9) Assume $x(t) = 2\cos(t) + 5\sin(2t) + 6\sin(3t)$ is the input to a system with transfer function $H(j\omega) = 3\text{rect}\left(\frac{\omega}{5}\right)$. In steady state the output of the system will be

a) $y(t) = \left[2\cos(t) + 5\sin(2t) + 6\sin(3t)\right]\left[3\text{rect}\left(\frac{\omega}{5}\right)\right]$

b) $y(t) = 6\cos(t) + 15\sin(2t) + 18\sin(3t)$

c) $y(t) = 6\cos(t) + 15\sin(2t)$

d) none of these

10) Assume $x(t) = 2\cos(3t) + 4\cos(5t)$ is the input to a system with transfer function given by

$$H(j\omega) = \begin{cases} 2 & 4 < |\omega| < 6 \\ 0 & else \end{cases}$$

The output of the system in steady state will be

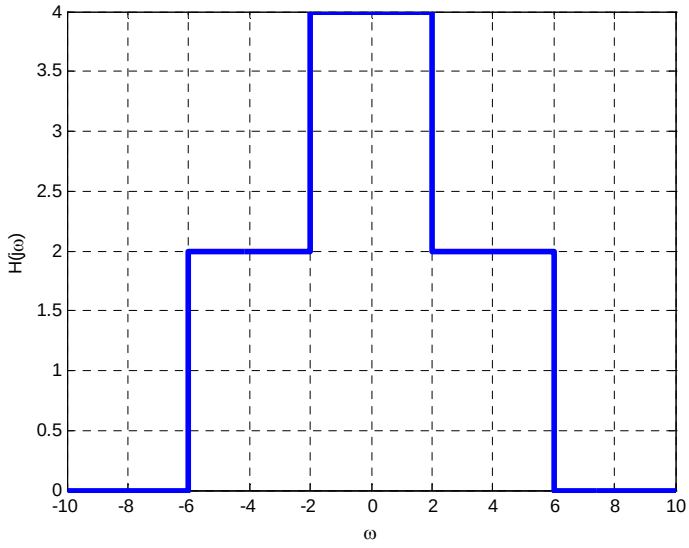
a) $y(t) = 4\cos(3t) + 8\cos(5t)$

b) $y(t) = 8\cos(5t)$

c) $y(t) = 4\cos(3t)$

d) none of these

11) Assume $x(t) = \cos(t) + \cos(5t) + \cos(9t)$ is the input to a system with transfer function given below:



The output of this system in steady state will be

a) $y(t) = 4\cos(t) + 4\cos(5t)$ b) $y(t) = 4\cos(t) + 2\cos(5t) + \cos(9t)$

c) $y(t) = 4\cos(t) + 2\cos(5t)$ d) none of these