Name________________________________ **CM**____________

Quiz 6

1) Using Euler's identity, we can write $\cos(\omega t)$ as

a) $\dfrac{e^{j\omega t}+e^{-j\omega t}}{2j}$ b) $\dfrac{e^{j\omega t}+e^{-j\omega t}}{2}$ c) $\dfrac{e^{j\omega t}-e^{-j\omega t}}{2}$ d) $\dfrac{e^{j\omega t}-e^{-j\omega t}}{2j}$

2) Using Euler's identity, we can write $\sin(\omega t)$ as

a) $\dfrac{e^{j\omega t}-e^{-j\omega t}}{2}$ b) $\dfrac{e^{j\omega t}-e^{-j\omega t}}{2j}$ c) $\dfrac{e^{j\omega t}+e^{-j\omega t}}{2j}$ d) $\dfrac{e^{j\omega t}+e^{-j\omega t}}{2}$

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

a) Yes b) No

Problems 4 -6 refer to the following Fourier series representation

$$x(t) = 1 + \sum_{k=-\infty}^{k=\infty} \frac{1}{1+jk} e^{jk\pi t}$$

4) The **average value** of $x(t)$ is a) 0 b) 1 c) 2 d) 3

5) The **fundamental frequency** (in Hz) is a) $\dfrac{1}{2\pi}$ b) 0.5 c) $\dfrac{1}{4\pi}$ d) 2

6) The **average power** in the first (fundamental) harmonic is

a) 0 b) 0.5 c) 1 d) 2 e) none of these

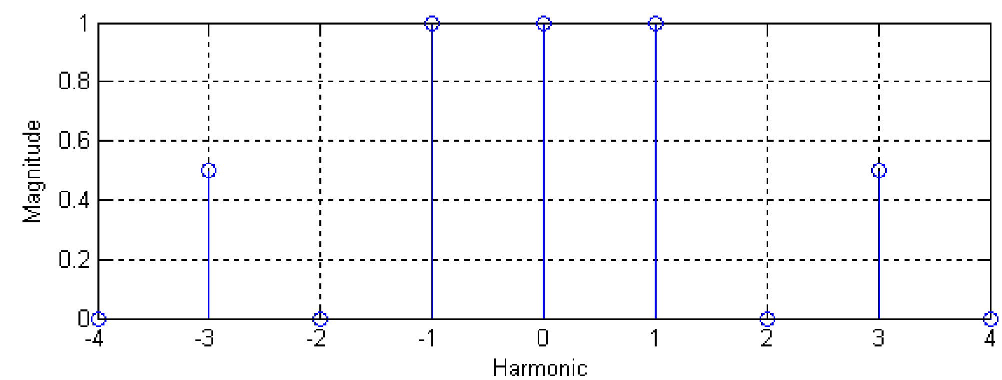
7) Assume $x(t)$ is a periodic function with period seconds $T=2$. $x(t)$ is defined over one period as

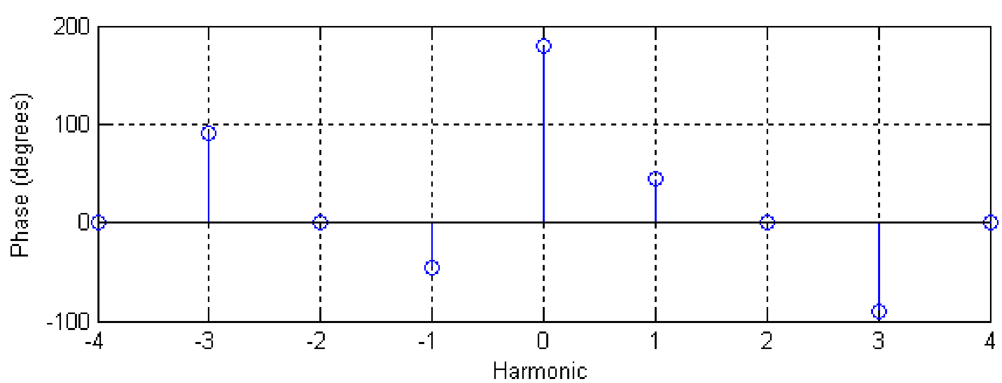
$$x(t) = \begin{cases} 2 & 0 \le t \le 1 \\ 1 & 1 < t < 2 \end{cases}$$

The **average power** in $x(t)$ (the power averaged over one period) is

a) 3 b) 5 c) 2.5 d) 1.5 e) none of these

Problems 8-10 refer to the following spectrum plot for a signal $x(t)$ with fundamental frequency $\omega_o = 2.5$. All angles are multiples of 45 degrees.





8) What is the **average value** of $x(t)$? a) 4 b) 2 c) -1 d) 1

9) What is the **average power** in $x(t)$? a) 4 b) 3.5 c) 2.25 d) 1.5

10) We can write $x(t)$ as

a) $x(t) = 1 + 1\cos(2.5t + 45^o) + 0.5\cos(7.5t - 90^o)$

b) $x(t) = -1 + 1\cos(2.5t + 45^o) + 0.5\cos(7.5t - 90^o)$

c) $x(t) = 1 + 2\cos(2.5t + 45^o) + 1\cos(7.5t - 90^o)$

d) $x(t) = -1 + 2\cos(2.5t + 45^o) + 1\cos(7.5t - 90^o)$

e) none of these