Name _____ CM_____

ECE-300, Quiz #5

Problems 1-5 refer to the following Fourier series representation of a periodic signal

$$x(t) = 2 + \sum_{k=-\infty}^{k=\infty} \frac{2}{2+jk} e^{\frac{jkt}{2}}$$

1) The average value of $x(t)$ is

a) 0 b) 1 c) 2 d) 3

2) The fundamental frequency (in Hz) is

a) $\frac{1}{2\pi}$ b) 0.5 c) $\frac{1}{4\pi}$ d) 2

3) If $x(t)$ is the input to a system with transfer function

$$H(\omega) = \begin{cases} 2 & |\omega| < 0.4 \\ 0 & else \end{cases}$$

the output $y(t)$ in steady state will be

a) 0 b) 3 c) 6 d) $1.79\cos(\pi t - 26.6^o)$ e) $6 + 3.58\cos(\pi t - 26.6^o)$

4) If $x(t)$ is the input to a system with transfer function

$$H(\omega) = \begin{cases} 2 & |\omega| > 0.4 \\ 0 & else \end{cases}$$

the output $y(t)$ in steady state will be

a) $2x(t)$ b) $2x(t) - 3$ c) $2x(t) - 6$ d) none of these

5) If $x(t)$ is the input to a system with transfer function

$$H(\omega) = \begin{cases} 0 & 0.4 < |\omega| < 0.6 \\ 2 & else \end{cases}$$

the output $y(t)$ in steady state will be

a) $1.79\cos(0.5t - 26.6^o)$ b) $3.58\cos(0.5t - 26.6^o)$

c) $2x(t) - 1.79\cos(0.5t - 26.6^o)$ d) $2x(t) - 3.58\cos(0.5t - 26.6^o)$

6) Assume $x(t) = 3\cos(2t - 5)$ is the input to a system with transfer function

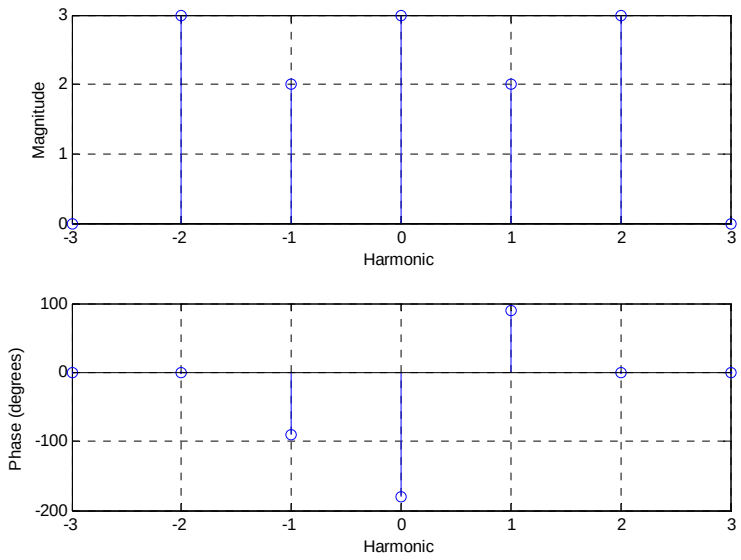
$$H(\omega) = \begin{cases} 3e^{-j2\omega} & |\omega| < 3 \\ 2 & else \end{cases}$$

the output $y(t)$ in steady state will be

a) $y(t) = 6\cos(2t - 5)$ b) $y(t) = 9\cos(2t - 5)$

c) $y(t) = 9\cos(2t - 5)e^{-j4}$ d) $y(t) = 9\cos(2t - 9)$

Problems 7-9 refer to the following spectrum plot for a signal $x(t)$ with fundamental frequency $\omega_o = 2$. All angles are multiples of 90 degrees.



7) What is the average value of $x(t)$? a) 13 b) $\frac{13}{7}$ c) $\frac{13}{5}$ d) 3 e) -3

8) What is the average power in $x(t)$? a) 13 b) $\frac{13}{7}$ c) 35 d) 3

9) If $x(t)$ is the input to a system with transfer function

$$H(\omega) = \begin{cases} 2 & 1 < |\omega| < 3 \\ 0 & else \end{cases}$$

the output $y(t)$ in steady state will be

a) $12\cos(2t)$ b) $4\cos(2t + 90^o)$ c) $8\cos(t + 90^o)$ d) $8\cos(2t + 90^o)$ e) $6\cos(2t)$