

EECS 360
Spring 2013
Quiz 3

Ave
5.8

# points	
10	2
9	1
8	5
7	0
6	4
5	3
4	4
3	4
2	2

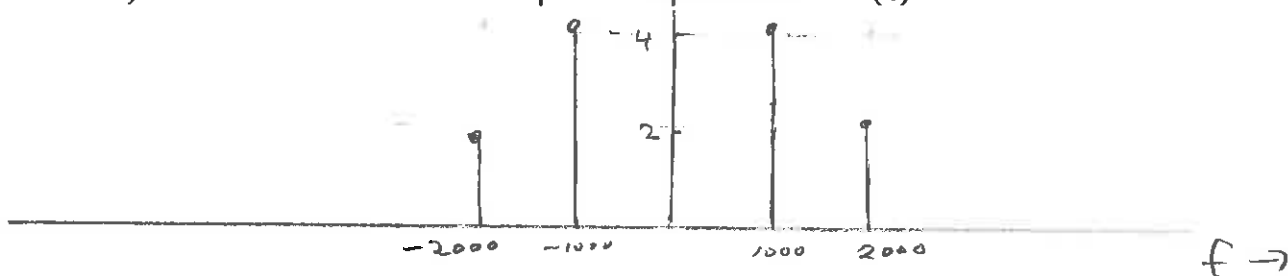
Name _____

Student ID # _____

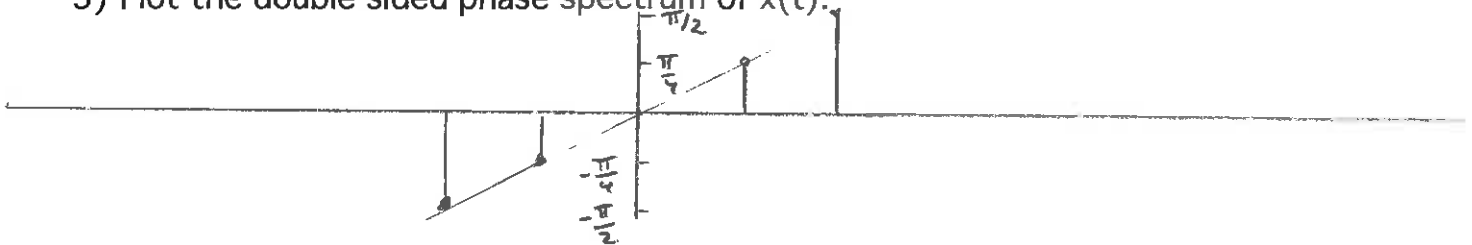
1) Find the CTFS for $x(t) = 8\cos(2\pi 1000t + \frac{\pi}{4}) + 4\cos(2\pi 2000t + \frac{\pi}{2})$.

$$\begin{aligned}
 x(t) &= \underbrace{2e^{-j\pi/2}}_{x_2, n=-2} e^{-j2\pi 2000t} + \underbrace{4e^{-j\pi/4}}_{x_1, n=-1} e^{-j2\pi 1000t} + \underbrace{4e^{j\pi/4}}_{x_1, n=1} e^{j2\pi 1000t} + \underbrace{2e^{j\pi/2}}_{x_2, n=2} e^{j2\pi 2000t} \\
 &= \sum_{n=-\infty}^{\infty} x_n e^{j2\pi n 1000t}
 \end{aligned}$$

2) Plot the double sided amplitude spectrum of $x(t)$.



3) Plot the double sided phase spectrum of $x(t)$.



4) What % of the total power is at 2 kHz?

$$x(t) = A \cos(2\pi f t + \phi)$$

$$P_2 = A^2/2$$

$$\text{Total power} = \frac{8^2}{2} + \frac{4^2}{2} = 40$$

$$\text{Power @ 2 kHz} = \frac{4^2}{2} = 8$$

$$\% = (8/40) \times 100 = 20\%$$