

Assignment #7 CE242 : Signals & Systems
Dept. of Computer Engineering
Sharif University of Technology
Fall 2006

Distributed: 9/20

Due: 9/28

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Solve the following problems from Oppenheim :

1- 7.23)

2- 7.26)

3- 7.30)

4- The signal $x(t)$ with maximum frequency component ω_x is multiplied by the modulation signal $y(t)$ with maximum frequency component $\omega_y = 2\omega_x$ giving the time domain signal $z(t)$.

a) Find the maximum frequency component of $z(t)$.

b) Find the maximum sampling interval Δt for the impulse train $p(t)$ which when multiplied by $z(t)$ will produce the signal $z_s(t)$ without aliasing. Sketch a possible sampled signal of $z_s(t)$ from $-10\omega_x \leq \omega \leq 10\omega_x$ showing important frequency values.

c) Design an ideal low pass filter $h(t)$ which could recover the original signal $z(t)$, from the sampled signal $z_s(t)$. Give the magnitude response of this filter in the frequency domain. Using a block diagram, sketch this system.