Problem 6.15

Given the input to the C-to-D converter is:

$x(t) = 7 + 8\cos(1000\pi t) + 9\cos(1600\pi t + 0.7\pi).$

Impulse response of the system: $h[n] = \sum_{k=0}^{4} \delta[n-k]$ and $f_s = 4000$ samples/s.

The output of the C-D converter is $x[n]$ which is denoted as:

$x[n] = x(t)|_{t=n/f_s} = 7 + 8\cos(0.25\pi n) + 9\cos(0.4\pi n + 0.4\pi)$

Using result obtained from Problem 6.14(c)in Homework 5 Solution,

$y[n] = 35 + 19.28\cos(0.25\pi n - 0.5\pi)$

Hence expression for $y(t)$:

$y(t) = y(n)|_{n=f_s t} = 35 + 19.28\cos(1000\pi t - 0.5\pi)$