Signals and Systems problem for the Spring 2012 MS Exam in ECE

Suppose a discrete linear time-invariant system has output $-\delta[n] + 2\delta[n-2]$ when the input is an impulse $\delta[n-1]$ centered at $n = 1$. What is the input to the system when the output is $-2\delta[n+3] + \delta[n+2] + 4\delta[n+1] - 4\delta[n] + 4\delta[n-2]$?