Assignment - 2

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Abstract—**This document contains the solution to the problem 2.35** (*b*) **of Oppenheimer.**

Problem 1. The system T is figure below is known to be time invariant. When the inputs to the system are $x_1[n]$, $x_2[n]$ and $x_3[n]$, the responses of the system are $y_1[n]$, $y_2[n]$ and $y_3[n]$.

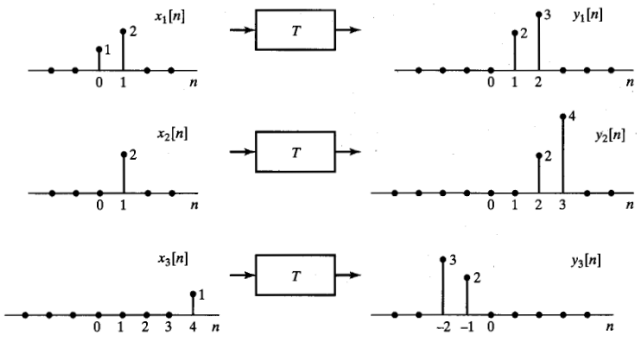

Figure P2.35-1

(b) If the input $x[n]$ to the system T is $\delta[n]$, what is the system response $y[n]$?
Solution: To find the impulse response of the system, we see from the figure:

$$\delta[n] = x_3[n+4] \tag{1}$$

Therefore,

$$T\{\delta[n]\} = T\{x_3[n+4]\} \tag{2}$$
$$T\{\delta[n]\} = y_3[n+4] \tag{3}$$
$$= 3\delta[n+6] + 2\delta[n+5] \tag{4}$$