## PROBLEM:

A cascade of two discrete-time systems is depicted by the following block diagram:

$$\begin{array}{c|c} x[n] & \text{LTI} \\ \text{System #1} \\ h_1[n], H_1(z) & \\ \end{array} \begin{array}{c|c} w[n] & \text{LTI} \\ \text{System #2} \\ h_2[n], H_2(z) & \\ \end{array}$$
 The systems are defined by the following:

 $x[n] = \delta[n] + \delta[n-1] - 2\delta[n-2],$ 

 $H_1(z) = (1 + 2z^{-2})$  and  $h_2[n] = (0.9)^{n-1}u[n-1].$ 

(a) If the input to the first system is

determine the output, w[n], of the **first** system.

$$w[n] =$$
(b) Determine the system function  $H(z)$  of the overall system.

$$H(z) =$$