$h[n] = (1/5)^n u[n]$

Prob 2.28

a/ - Causal since $h[n] = 0$ for $n < 0$

- stable since $\sum_{n=0}^{\infty} \left(\frac{1}{5}\right)^n = \frac{1}{1-\frac{1}{5}} = \frac{5}{4} < \infty$

b/ - Not Causal since $h[n] \neq 0$ for $n < 0$

$h[n] = (0.8)^n u[n+2] \Rightarrow$ - stable since $\sum_{n=-2}^{\infty} (0.8)^n = \frac{1}{1-0.8} = \frac{1}{0.2} = 5 < \infty$

c/ - Not Causal since $h[n] \neq 0$ for $n < 0$

$h[n] = \left(\frac{1}{2}\right)^n u[-n] \Rightarrow$ - Unstable since $\sum_{n=-\infty}^{0} \left(\frac{1}{2}\right)^n = \infty$

d/ $h[n] = (5)^n u[3-n]$

- Not Causal since $h[n] \neq 0$ for $n < 0$

- Stable since $\sum_{n=-\infty}^{3} 5^n = \sum_{n=-3}^{\infty} \left(\frac{1}{5}\right)^n = \left(\frac{1}{5}\right)^{-3} \sum_{n=0}^{\infty} \left(\frac{1}{5}\right)^n$

$= 5^3 \frac{1}{1-\frac{1}{5}} = 5^3 \cdot \frac{5}{4} = \frac{625}{4} < \infty$

e/ $h[n] = \left(-\frac{1}{2}\right)^n u[n] + (1.01)^n u[n-1]$

- Causal since $h[n] = 0$ for $n < 0$

- Unstable because $\sum_{n=1}^{\infty} (1.01)^n = \infty$

f/ $h[n] = \left(-\frac{1}{2}\right)^n u[n] + (1.01)^n u[1-n]$

- Not Causal since $h[n] \neq 0$ for $n < 0$

- Stable since $\sum_{n=-\infty}^{\infty} |h[n]| = \frac{305}{3} < \infty$

g/ $h[n] = n \left(\frac{1}{3}\right)^n u[n-1]$

- Causal since $h[n] = 0$ for $n < 0$

- Stable since $\sum_{n=1}^{\infty} |h[n]| = 1 < \infty$