

**PROBLEM:**

For each of the systems defined on the left, find the corresponding frequency response on the right. Pick the correct frequency response and enter the number in the answer box:

**Impulse Response or Difference Equation****Frequency Response**

(a)  $y[n] = \left( (-\frac{1}{2})^n u[n] \right) * \left( \delta[n] + \delta[n - 1] \right)$

**ANS =**

(b)  $y[n] = \frac{1}{2}y[n - 1] + x[n]$

**ANS =**

(c)  $h[n] = \delta[n] + \delta[n - 2]$

**ANS =**

(d)  $h[n] = \delta[n] - (\frac{1}{2})^n u[n - 1]$

**ANS =**

(e)  $h[n] = (-\frac{1}{2})^n u[n]$

**ANS =**

1.  $H(e^{j\hat{\omega}}) = \frac{1 + \frac{1}{2}e^{-j\hat{\omega}}}{1 + e^{-j\hat{\omega}}}$

2.  $H(e^{j\hat{\omega}}) = \frac{1}{1 + \frac{1}{2}e^{-j\hat{\omega}}}$

3.  $H(e^{j\hat{\omega}}) = 1 + e^{-j\hat{\omega}}$

4.  $H(e^{j\hat{\omega}}) = 2e^{-j\hat{\omega}} \cos(\hat{\omega})$

5.  $H(e^{j\hat{\omega}}) = \frac{1}{1 - \frac{1}{2}e^{-j\hat{\omega}}}$

6.  $H(e^{j\hat{\omega}}) = \frac{1 - e^{j\hat{\omega}}}{1 - \frac{1}{2}e^{-j\hat{\omega}}}$

7.  $H(e^{j\hat{\omega}}) = 1 + \frac{1}{2}e^{-j\hat{\omega}}$

8.  $H(e^{j\hat{\omega}}) = \frac{1 + e^{-j\hat{\omega}}}{1 + \frac{1}{2}e^{-j\hat{\omega}}}$