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F. $Y(z) = 2\sum_{n=0}^{\infty} \frac{2}{5z} - \sum_{n=0}^{\infty} \frac{1}{5z} = \frac{2}{1-\frac{2}{5z}} - \frac{1}{1-\frac{1}{5z}} = \frac{2z}{z-\frac{2}{5}} - \frac{z}{z-\frac{1}{5}}$

$$Y(z) = \frac{2z(z-\frac{1}{5}) - z(z-\frac{2}{5})}{(z-\frac{2}{5})(z-\frac{1}{5})} = \frac{2z^2 - \frac{2}{5}z - z^2 + \frac{2}{5}z}{(z-\frac{2}{5})(z-\frac{1}{5})}$$

$$Y(z) = \frac{z^2}{(z-\frac{2}{5})(z-\frac{1}{5})}$$

$$X(z) = \frac{Y(z)}{H(z)} = \frac{\frac{z^2}{(z-\frac{2}{5})(z-\frac{1}{5})}}{\frac{z^2+2}{(z-\frac{2}{5})(z-\frac{1}{5})}} \rightarrow X(z) = \frac{z^2}{z^2+2}$$

$$x[n] = z^{-1}\left(\frac{z^2}{z^2+2}\right)$$