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$$\therefore N = \frac{0.4771}{\log\left(\frac{0}{1.9626}\right)} = 0$$

$\therefore y(n) = x(n)$

(*) For $F_S = 1000\ Hz$

$$T = \frac{1}{1000} = 2.5 \times 10^{-4}$$

$$\Omega_p = \frac{2}{2.5 \times 10^{-4}} \tan\left(\frac{2000\pi \times 10^{-4} \times 2.5}{2}\right)$$

$$= 8000 \tan(0.25\pi)$$

$$= 8000$$

$$\Omega_S = \frac{2}{2.5 \times 10^{-9}} \tan\left(\frac{706\pi \times 10^{-4}}{2} \times 2.5\right)$$

$$= 8000 \tan(0.0875\pi)$$

$$= 2256.23$$

$$N = 1$$

$$H(s) = \left| \frac{s}{s+8000} \right. = \frac{s}{s+8000}$$

$$H(z) = H(s) \Big|_{s = \frac{2}{T}\left(\frac{1-z^{-1}}{1+z^{-1}}\right)}$$