**Problem 3: (50 points)**

Using the bilinear transformation, design a highpass filter, monotonic in passband with cutoff frequency of 1000 Hz and down 10 dB at 350 Hz. The sampling frequency is 5000 Hz. Implement using basic building blocks. Show the derivation for this filter. Demonstrate the filter’s output for 5 different frequencies ranging from 100 Hz to 10000 Hz. Choose these frequencies smartly to demonstrate the filter working





