Diagram of this discharge silencer is shown below

The area around the extended inlet pipe could be seen as a side branch.

1. Derive the expression of the acoustic impedance at the open end of the annular section of the device, that is, at the location where Z is marked on the diagram.
2. Use this result to derive an expression for the sound power transmission coefficient of the reactive section of the device.
3. Plot the sound power transmission coefficient of the reactive section of the device as a function of kL for kL from 0 to 2pi.

of the side branch, where x = L, the total of the particle velocities associated with the positive and negative propagating waves must be zero