1. Design a Delyiannis-Friend filter for a peak frequency of $f_0 = 12.5$ kHz, a midband voltage gain of 20, and a pole $Q = 10$. Set $C = 5$ pF.

2. (a) Find the admittance matrix $Y$ of the two-port shown below.

(b) Find its scattering matrix when it operates between two 1 kΩ resistors. What are the power transmission properties of the terminated two-port?

(c) Find the sensitivities of the output voltage $V_o$ to variations of $R$ and $r$ if instead of the 1 kΩ terminations the two-port is driven by a 1 V voltage source, and its output is open circuited.