\[ R_G = 60 \Omega, \quad R_T = 150 \Omega, \quad Z_{01} = 60 \Omega, \quad Z_{02} = 50 \Omega \]
\[ V_{g1} = 2 \times 10^5 \text{ V/m}, \quad V_{g2} = 1.5 \times 10^5 \text{ V/m} \]
\[ Z_{r1} = 2 \times 10^5 \text{ V/m}, \quad Z_{r2} = 9 \text{ mm} \]

\[ S_G = \frac{R_G - Z_{01}}{R_G + Z_{01}} = \frac{60 - 60}{60 + 60} = 0 \]

\[ S_R = \frac{R_T - Z_{02}}{R_T + Z_{02}} = \frac{150 - 50}{150 + 50} = 0.5 \]

\[ S_{11} = \frac{Z_{r1} - Z_{r2}}{Z_{r1} + Z_{r2}} = \frac{50 - 60}{50 + 60} = -\frac{1}{11} \approx -0.0909 \]

\[ S_{21} = 1 + S_{11} = \frac{10}{11} \approx 0.9091 \]

\[ S_{22} = \frac{Z_{r1} - Z_{r2}}{Z_{r1} + Z_{r2}} = -S_{11} = -\frac{1}{11} \approx 0.0909 \]

\[ S_{12} = 1 + S_{22} = \frac{12}{11} \approx 1.0909 \]

\[ b_{r1} = \frac{Z_{r1}}{V_{p1}} = \frac{20 \times 10^5 \text{ V/m}}{2 \times 10^5 \text{ V/m}} = 100 \text{ msec} \]

\[ b_{r2} = \frac{Z_{r2}}{V_{p2}} = \frac{9 \times 10^5 \text{ V/m}}{1.5 \times 10^5 \text{ V/m}} = 60 \text{ msec} \]
\[ V_G' = V_G \left( \frac{2Q_1}{R_E + 2Q_1} \right) = \frac{1}{2} V_G = 6V \]
b) In order to eliminate reflected waves returning to $R_T$, $s_{22} = 0$.

Since $Z_{01} > Z_{02}$, add resistor in parallel at junction $Z = Z_{01}$

$$s_{22} = \frac{Z_{01} || R_{3II} - Z_{02}}{Z_{01} || R_{3II} + Z_{02}} = \frac{1}{\frac{1}{Z_{01}} + \frac{1}{R_{3II}}} = \frac{1}{\frac{1}{Z_{02}}} = \frac{Z_{02}}{Z_{01}} = 0$$

$$\Rightarrow Z_{01} || R_{3II} = Z_{02}$$

$$\frac{1}{Z_{01}} + \frac{1}{R_{3II}} = \frac{1}{Z_{02}}$$

$$R_{3II} = \frac{1}{\frac{1}{Z_{01}} - \frac{1}{Z_{02}}} = \frac{Z_{01} Z_{02}}{Z_{01} - Z_{02}}$$

Like a minimum loss and can also be used ($s_{22} = 0$ and $s_{33} = 0$)

$$R_A = \sqrt{Z_{01} || Z_{02}} = 24.5 \Omega$$

$$R_C = Z_{02} \sqrt{Z_{01} || Z_{02}} = 122.5 \Omega$$

(Other solutions for $R_A$ and $R_C$ are also possible such that $s_{33} = 0$)