1.) set: $V_{RS}=1V$, $V_{DD}=5V$, $|A_v|=25$, $\hat{V}_o=25$

$$V_{RD}=\frac{V_{DD}-\hat{V}_o-V_{RS}}{1+\frac{2}{|A_v|}} \approx -18V$$

$$V_{ov}=\frac{2V_{RD}}{|A_v|}=-1.4V$$

Set $\boxed{R_D=4k\Omega}$, $A_v=\frac{V_{o,ac}}{V_i}=-\frac{R_D}{\left(\frac{1}{g_m}\right)}=-g_mR_D \Rightarrow g_m=-0.0625$

$$|A_v|=g_mR_D=g_m\frac{V_{RD}}{I_D} \Rightarrow I_D=-45mA$$

$$\boxed{R_S=\frac{V_{RS}}{I_D}=22\Omega}$$

set $V_T=25mV$, $V_{RG2}=V_{RS}+|V_t|+V_{ov}=2.425V$

set $R_{id}=R_G=10.5k\Omega$

$$\begin{cases} R_{G2}=\frac{R_{G1}R_{id}}{R_{G1}-R_{id}} \\ R_{G1}=\frac{R_{id}V_{DD}}{V_{RS}+|V_t|+V_{ov}} \end{cases} \Rightarrow \boxed{\begin{array}{l} R_{G2}=20.4k\Omega \\ R_{G1}=21.6k\Omega \end{array}}$$

2.) set: $V_{RS}=1V$, $V_{DD}=5V$, $|A_v|=25$, $V_o=25$, $\hat{V}_o=0.2V$

$$V_{RD}=\frac{V_{DD}-\hat{V}_o-V_{RS}}{1+\frac{2}{|A_v|}} \approx -18V$$

$$V_{ov}=\frac{2V_{RD}}{|A_v|}=-1.4V$$

set $\boxed{R_D=4k\Omega}$, $A_v=\frac{V_{o,ac}}{V_i}=-\frac{R_D}{\left(\frac{1}{g_m}\right)}=-g_mR_D \Rightarrow g_m=-0.0625$

$$|A_v|=g_mR_D=g_m\frac{V_{RD}}{I_D} \Rightarrow I_D=-45mA$$

$$\boxed{R_S=\frac{V_{RS}}{I_D}=22\Omega}$$

set $V_T=25mV$, $V_{RG2}=V_{RS}+|V_t|+V_{ov}=2.425V$

set $R_{id}=R_G=10.5k\Omega$

$$\begin{cases} R_{G2}=\frac{R_{G1}R_{id}}{R_{G1}-R_{id}} \\ R_{G1}=\frac{R_{id}V_{DD}}{V_{RS}+|V_t|+V_{ov}} \end{cases} \Rightarrow \boxed{\begin{array}{l} R_{G2}=20.4k\Omega \\ R_{G1}=21.6k\Omega \end{array}}$$