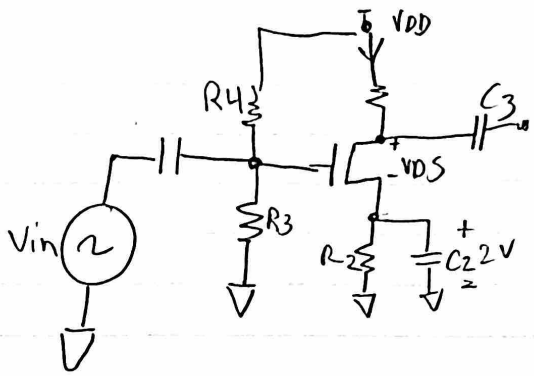
Q.9.



$$R_2 = \frac{2V}{250\mu A} = 8K\Omega$$

$$V_{DS} = V_{R_1} = \frac{V_{DD}-2V}{2} = \frac{12V-2V}{2V} = 5V$$

$$R_1 = \frac{V_{R_1}}{I_{DS}} = \frac{5V}{250\mu A} = 20K\Omega$$

$$V_G = \frac{R3}{R3+RV} \cdot V_{DD} = \therefore V_G \cdot R_4 = \frac{R_3 R_4}{R_3+R_4} V_{DD} = R_{eq} \cdot V_{DD}$$

$$R_4 = \frac{V_{DD}}{V_G} \cdot R_{eq}$$

Assuming Sat : $I_{ds} = \frac{1}{2} \cdot kp \cdot \frac{W}{L} V^2_{GT} = \frac{1}{2} kp \cdot \frac{W}{L} (V_{GS}-V_{th})^2$

$$V_G = V_{GS}+V_S = 3V+2V = \underline{5V = V_G}$$

$$R_4 = \frac{V_{DD}}{V_g} \cdot R_{eq} = \frac{12V}{5} \cdot 250K\Omega = \underline{600K\Omega}$$

$$R_3 = \frac{1}{\frac{1}{R_{eq}} - \frac{1}{R_4}} = \frac{1}{\frac{1}{250K\Omega} - \frac{1}{600K\Omega}} = \underline{428.57K\Omega}$$

$R_1 = 20K\Omega$, $R_2 = 8K\Omega$, $R_3 = 428.57K\Omega$, $R_4 = 600K\Omega$