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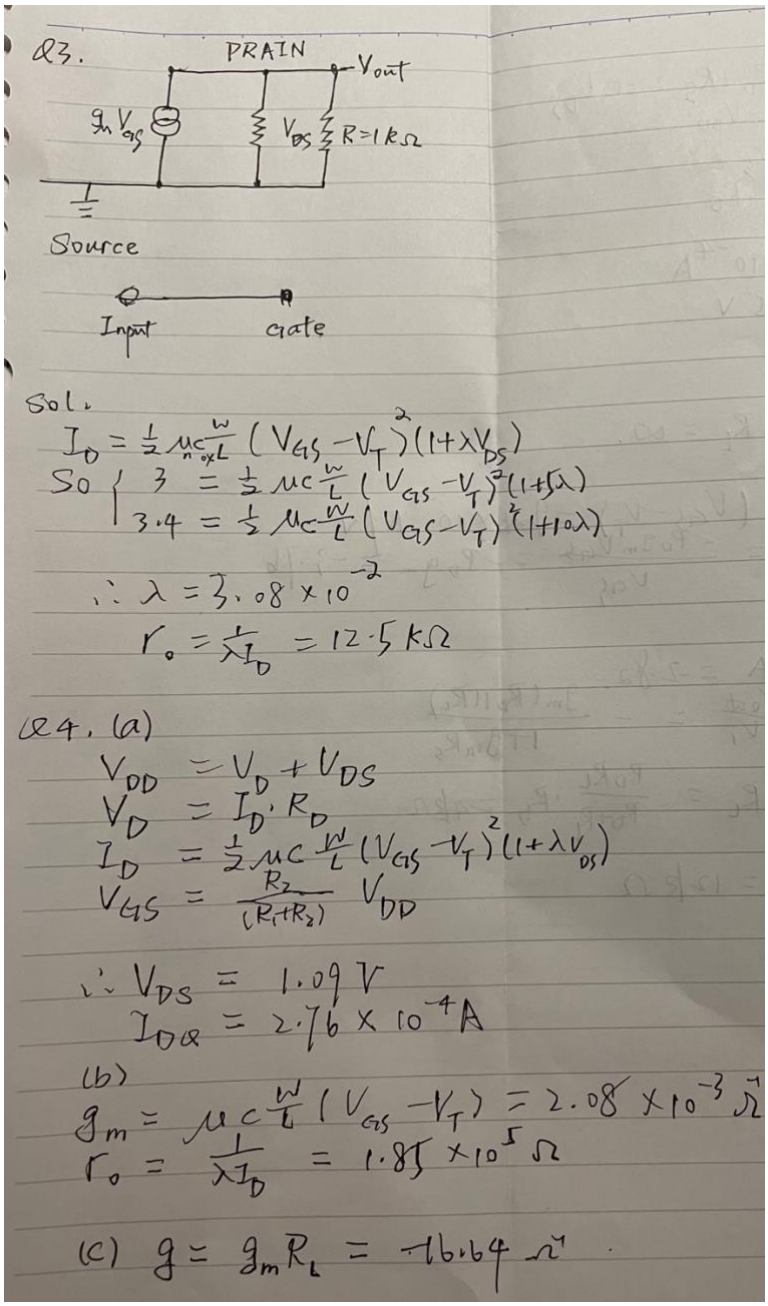
Q1
BCABA

Q2
（a）Small Signals are small changes that are so small that they stay is a region on the curve where everything looks like a straight line.
（b）Clipping is a form of distortion. When the signal is digitized, or when analog or digital signal conversion occurs at any other time, shearing may occur, resulting in partial signal loss. To avoid clipping, a limiter can be used to dynamically reduce the signal.



Q5. sol

(a)
$$\begin{cases} V_{DD} = I_D (R_D + R_S) + V_{DS} \\ V_G = \frac{R_2}{R_1 + R_2} \cdot V_{DD} \\ V_{GS} = V_G - V_S \\ V_S = I_D \cdot R_S \end{cases}$$

$\therefore I_D = 4.5 \times 10^{-4} A$

$V_{DS} = 2.75 V$

(b) sol. When $R_L = \infty$.

$$g_m = \mu_n C_{ox} \frac{W}{L} (V_{GS} - V_T) = 9.4 \times 10^{-4} A/V$$

$$A = \frac{V_{out}}{V_i} = \frac{-R_D g_m V_{GS}}{V_{GS}} = -R_D g_m = -3.76$$

(c) $A' = 0.75A = -2.82$

$$A = \frac{V_{out}}{V_i} = -\frac{g_m (R_D \| R_L)}{1 + g_m R_S}$$

$\therefore R_D \| R_L = \frac{R_D R_L}{R_D + R_L} = 4k\Omega$

$\therefore R_L = 12k\Omega$