

TYU 3.12 The circuit shown in Figure 3.45 is biased at $V_{DD} = 10$ V, and the transistor parameters are $V_{TN} = 0.7$ V and $K_n = 4 \text{ mA/V}^2$. Design the value of R_D such that the output voltage will be $v_O = 0.20$ V when $v_I = 10$ V. (Ans. $0.666 \text{ k}\Omega$)

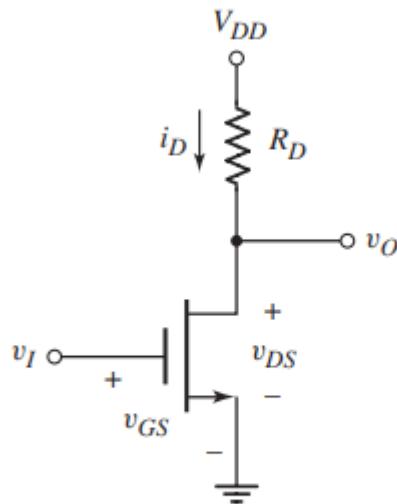
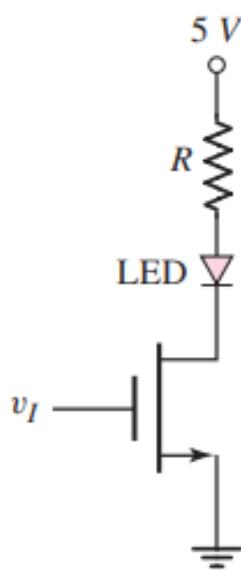


Figure 3.45 NMOS inverter circuit

1. The transistor in the circuit shown in Figure has parameters $K_n = 4 \text{ mA/V}^2$ and $V_{TN} = 0.6V$, and is used to switch the LED on and off. The LED cut-in voltage is $V_\gamma = 1.2V$. The LED is turned on by applying an input voltage of $V_I = 5V$. $R = 1.2k$. Determine I_D and V_{DS} .
2. The transistor in the circuit shown in Figure has parameters $K_n = 3 \text{ mA/V}^2$ and $V_{TN} = 0.6V$, and is used to switch the LED on and off. The LED cut-in voltage is $V_\gamma = 1.6V$. The LED is turned on by applying an input voltage of $V_I = 5V$. Design R such that $V_{DS} = 0.15V$ for $V_I = 5V$. Determine I_D .



1. The transistor in the circuit shown in Figure has parameters $K_P = 3 \text{ mA/V}^2$ and $V_{TP} = -0.6V$, and is used to switch the LED on and off. The LED cutin voltage is $V_y = 1.2V$. The LED is turned on by applying an input voltage of $V_I = 0V$. Design R_D such that $V_{DS} = -0.12V$ for $V_I = 0V$. Determine I_D .

