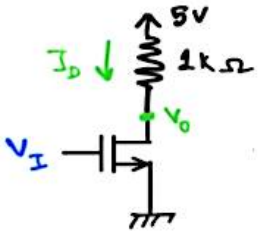
1. *Construct the circuit with nmos switches and resistors to implement the logic functions* [20]

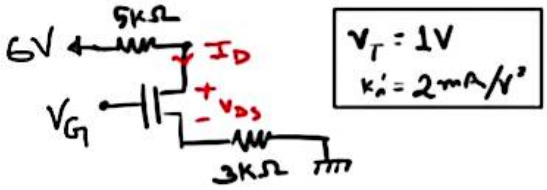
a)A+B'C b)(AB+C+D) c)A'B+AB' d)(A'+B)'

Solve the Q2-Q7 mosfet circuits using Assumed states method



2) What will be the change in the mosfet current if the V_I is changed from 2V to 5V. Assume k=2 mA/V2 , V_T =1 V [15]

3)Find the gate voltage of the mosfet when the voltage at source node, Vs=1.5V . [10]



4)For figure-1, k=2 mA/V2 , V_T =1 V

i)Find the gate voltage so that the mosfet is in saturation mode.

ii) Then find the minimum supply voltage Vss to operate the device in this condition. [Hints , Vov=VDS] [10]

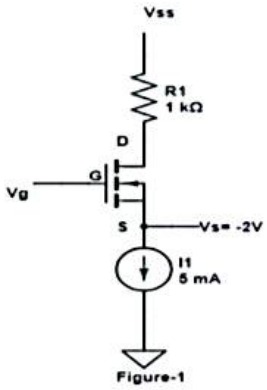
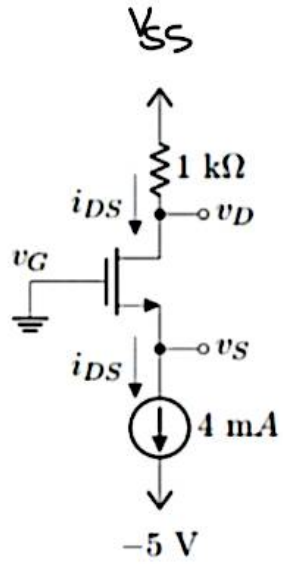


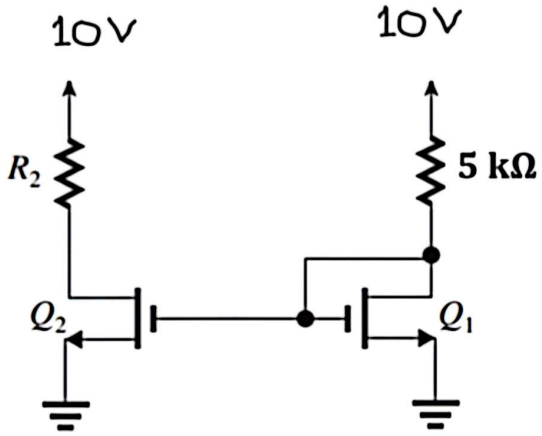
Figure-1

5) If Vss=10V what is the value of drain voltage and source voltage? [10]



6)In the circuit above, the MOSFETs have the following parameters, k'_n=2 mA/V2, W/L= 2, V_T=1 V.

a)What are the gate voltages of the mosfet?
b) for what value of R2 the Q2 mosfet will draw 1 mA current in the triode mode. *[20]*

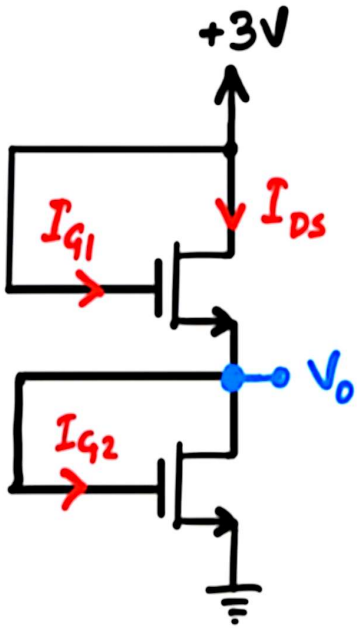


7)

In the circuit shown in the figure below, the transistor is characterized by $V_T = 1\,V$, $k = 1\,\text{mA/V}^2$. (Hint: Identify the modes of the two MOSFET, and equate the two currents.)

(a) ***[3 marks]*** Find the value of V_O indicated in the figure.

(b) ***[3 marks]*** Find the values of I_{DS}, I_{G1} and I_{G2}.



[15]