NANYANG TECHNOLOGICAL UNIVERSITY SCHOOL OF ELECTRICAL & ELECTRONIC ENGINEERING

ACADEMIC YEAR 2020-2021
SEMESTER 2

EE3019 INTEGRATED ELECTRONICS

TUTORIAL 1

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1. Figure 1.1 depicts the schematic diagram of a CMOS inverter. Draw the top view and cross sectional view of an integrated CMOS inverter. Indicate clearly the Drain (D), Source (S), Gate (G), Body (B), Channel Width (*W*) and Channel Length (*L*) of the pMOS and nMOS transistors. List two types of interconnects commonly used for integrated circuits.

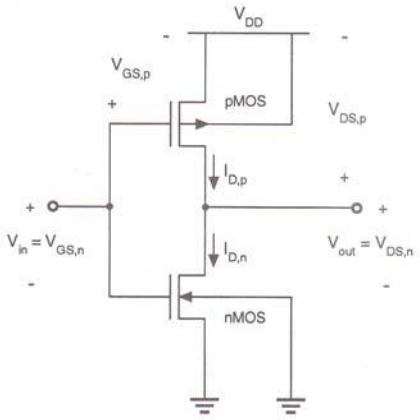

Figure 1.1

2. Find the quiescent point of the PMOS transistor in Figure 1.2 given that V_{t0} = -2V and $\frac{1}{2}\mu_p C_{ox}(W/L)$ = 50uA/V^2.

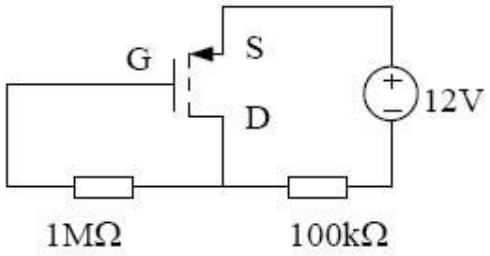

Figure 1.2

[Answer: v_{SG} = 3.32 V, i_D = 86.8 μA]

3. Determine the region of operation for the transistor in Figure 1.3, given that V_{t0} = -1V and $\frac{1}{2}\mu_p C_{ox}(W/L)$ = 125uA/V^2.

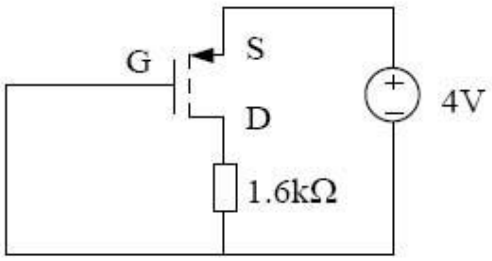

Figure 1.3

[Answer: *Triode*]