COE360 – Assignment # 7
Dr. M. Elrabaa (052)

Q1) Design an NMOS inverter with a depletion load such that V_{OL} = 0.5V, V_{OH} = 5V and the average DC power is 1.25mW. Use a 1 m technology (**V_{DD}=5V, C_{ox}=2 fF/μm^2, μ_n=600 cm^2/S·V, $I_{Dsat_{nmos}}$= 500 μA/μm, and V_{tn} = 0.8 V**). **Assume that the depletion NMOS has a threshold voltage of -2V.**

1. Calculate the noise margins of this inverter,
2. If this inverter has a Fan out of three and a total wiring capacitance at the output of 50 fF, calculate its average propagation delay and maximum possible input frequency.
3. Calculate the input frequency at which the average DC power will equal the average dynamic power.