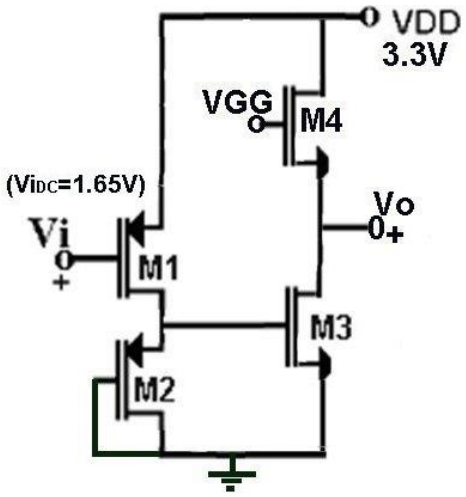
Analog Electronic Circuits **Summer-2020 Midterm-1** **13.08.2020**



For the transistors in the figure V_{DD}=3.3V, C_{ox} =50 fF/(μm)^2, μ_n = 0.06 m^2.V^{-1}.s^{-1}, μ_p= 0.02 m^2.V^{-1}.s^{-1}, V_{THN} = 0.5V, V_{THP} = -0.5V , $(W/L)_1$=2 , $(W/L)_2$=20 , $(W/L)_3$=10, $(W/L)_4$=1 and (for all the transistors) L=2μm are given.

Note: $c_{gs} \approx W.L.cox$, $c_{gd} \approx c_{gs}/3$

a) DC value at the input is 1.65V. What should VGG be for Vo=1.65V?

b) (Part a is not necessary) Draw magnitude of Vo/Vi versus frequency. Find the cut-off frequency.

c) (Part a is not necessary) Draw phase of Vo/Vi versus frequency.