Nanyang Technological University
School of Electrical & Electronic Engineering
EE2002 Analog Electronics – Tutorial 12

1. In the common-base circuit shown in Figure 1, the transistor has $\beta = 100$, $V_A = \infty$, $C_\mu = 1$pF and $f_T = 285$ MHz. Assume $V_T = 25$ mV. Using open-circuit time constant method, determine the upper 3-dB frequency of the amplifier.

(Ans: 813 Mrad/s)

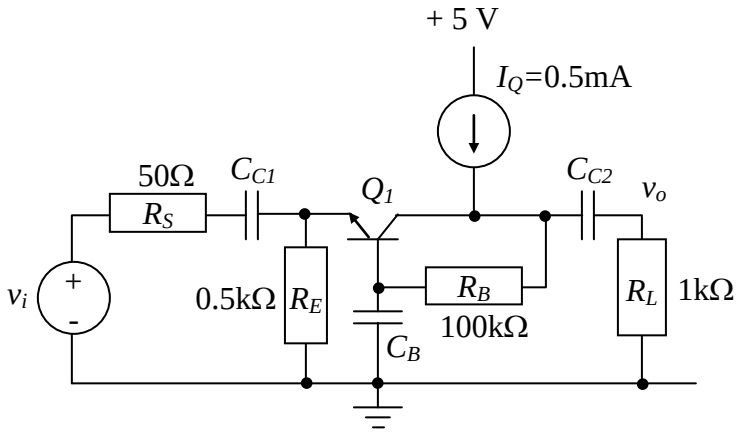

Figure 1

2. Using the open-circuit short-circuit time constant method, determine the lower -3dB frequency (ω_L) for the amplifier circuit shown in Figure 2. Assume that a signal source v_s with a series resistance R_S =1 MΩ is connected to the input at G through a coupling capacitor C_1 = 1μF, while a load resistor R_L = 10 kΩ is connected to the output at D through a coupling capacitor C_2 = 1μF. The resistance R_1 = 5 MΩ. For the transistors Q_1 and Q_2, $\mu_n C_{ox1}(W_1/L_1) = \mu_p C_{ox2}(W_2/L_2) = 50\ \mu A/V^2$, $|V_{TP}| = V_{TN}$ = 2V, and $\lambda = 0.005\ V^{-1}$.

Ans: 34.9 rad/s

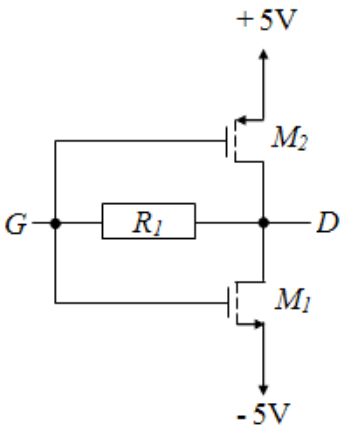

Figure 2