VE311 Electronic Circuits

Homework 08

UM-SJTU JI

Shen Jiaqi
Zhang Xinwei
Mario Alberto García-Ramírez, PhD

The course homework is intended for the students to learn and to think rather that just copy and paste. This is why, me and my TAs team are confident that you're going to learn.

1. Write an expression for the transfer function of the amplifier (Fig. 1) and identify the location of the two low-frequency poles and two low-frequency zeros. Assume $r_o = \infty$ and $g_m = 5$ mS. What are the lower-cut off frequency and midband gain of the amplifier?
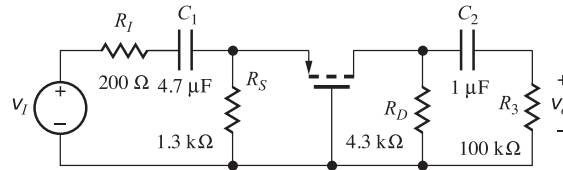

Figure 1: Schematic Diagram of a Common-Gate Amplifier

2. What are the midband gain and upper-cut off frequency for the common-emitter amplifier shown in Fig. 2, if $I_C = 1$ mA and $\beta_0 = 100$?, What is the gain-bandwidth product for this amplifier?
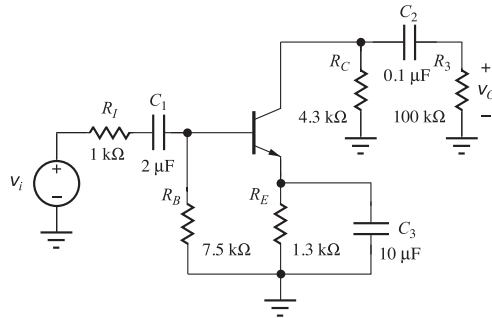

Figure 2: Schematic Diagram of a Common-Emitter Amplifier

3. Find A_{mid}, f_L and f_H for the amplifier depicted in the follow Fig. 3, if $\beta_0 = 100$, $f_T = 200$ MHz, $C_\mu = 1$ pF and $r_s = 350$ Ω
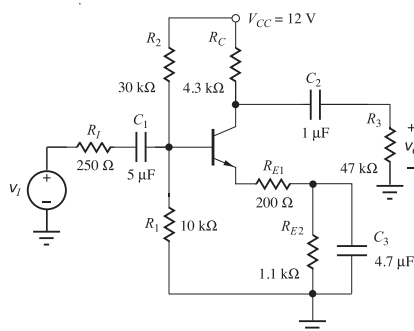

Figure 3: Schematic Diagram of a Common-Emitter Amplifier

4. By using the proper tools (hint: **"Spice"**) analyze (I mean "simulate") the follow circuit depicted in Fig 4. Obtain the magnitude and phase of the multistage circuit for the follow set of parameters: $v_i = 10\cos(2\pi f t)$ where $f= 0.002$ Hz, 1 Hz, 50 kHz, 2 GHz. It is expected that the student give a proper explanation for the results obtained. This example was solved in class, so the answer sholuld be according to.
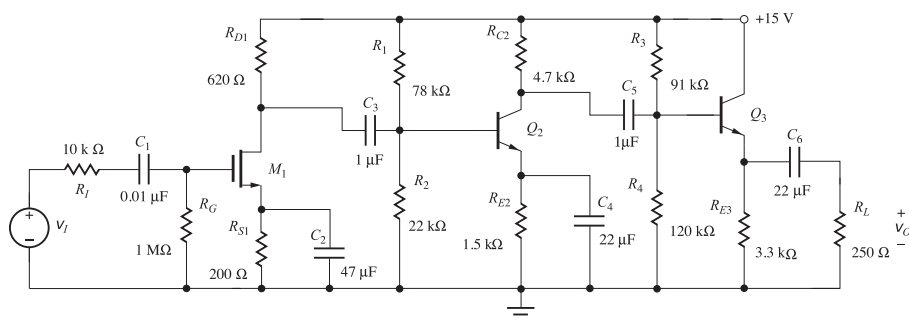

Figure 4: Schematic Diagram of a Three Stage Amplifier