PROBLEM SET #8

Issued: Friday, October 19, 2018

Due: Friday, October 26, 2018 at 12:00 noon via Gradescope.

1. Sedra & Smith, Problem 7.38
2. Sedra & Smith, Problem 7.58
3. Sedra & Smith, Problem 10.16
4. Sedra & Smith, Problem 10.17
5. Sedra & Smith, Problem 10.25

6. a) Find the Q-point for the amplifier in Figure PS8.1. \( V_A = 100V, \beta_F = 100, V_{cc} = +12V, V_{ee} = -12V, R_s = 1k\Omega, R_1 = 10k\Omega, R_2 = 5k\Omega, R_3 = 24k\Omega, R_E = 4k\Omega, R_C = 6k\Omega \) and \( R_F = 100M\Omega \). Assume all the capacitors have infinite capacitance. b) Determine the gain \( \frac{v_o}{v_s} \). (Hint: Make proper approximation).

7. Figure PS8.1 shows a CE amplifier with a feedback resistor \( R_F \). \( V_A = 100V, \beta_F = 100, V_{cc} = 12V, V_{ee} = -12V, R_s = 1k\Omega, R_1 = 10k\Omega, R_2 = 5k\Omega, R_3 = 24k\Omega, R_E = 4k\Omega, R_C = 6k\Omega, R_F = 10k\Omega \). Assume all the capacitors have infinite capacitance. Determine the gain \( \frac{v_o}{v_s} \).

8. A BJT with \( C_{\mu 0} = 2pF \) is biased at a Q-point of (2mA, 5V). What is the forward-transit time \( \tau_F \) if \( f_T = 500MHz, \phi_{jc} = 0.9V \), and \( C_{je} = 7pF \)?

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**Figure PS8.1**

![Figure PS8.1](image-url)