

## 97.455 Assignment #3 Marking Scheme

Peter Popplewell

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1. Calculate the oscillation frequency. (1 mark)
2.
  - a) Calculate  $V_E$ ,  $V_B$ ,  $V_C$ ,  $r_e$ ,  $I_C$ , and  $g_m$  (6 \* 1 mark each = 6 marks)
  - b) Calculate  $R_L$  (5 marks)
  - c) Calculate series equivalent capacitance  $C_S$  (5 marks), and then calculate  $C_1$  and  $C_2$  (2 \* 2 marks each = 4 marks)
3. Perform open-loop frequency-domain analysis, and show simulation results. Determine frequency of oscillation (5 marks), determine gain margin (5 marks), and explain ANY and ALL deviations from theory (5 marks). No simulation results = no marks! ;-)
4. Perform closed-loop time-domain analysis, and show simulation results. Determine startup time (3 marks), determine the amplitude of oscillation (5 marks), determine the oscillation frequency from the time domain (2 marks), and explain ANY and ALL deviations from theory and or the open loop results (5 marks). Again, no simulation results = no marks!

Note: Using the FFT is useful to double-check the frequency you calculated from the time waveform.

Total = 50 marks