ECE 322 Electronics-1, Fall 2017

Test Date: 11/20/2017

Problems: 3

Total Pages: 6

Name: _____

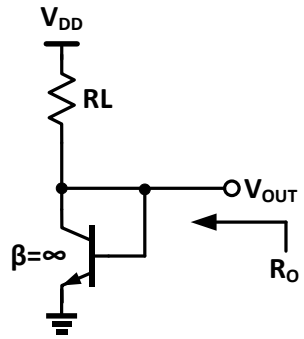
1. **(25 points)** _____
2. **(30 points)** _____
3. **(30 points)** _____

Total (85 points) _____

Good Luck!

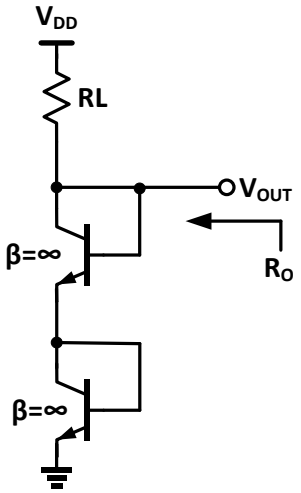
Problem 1 (a) (10 points): For circuit show below, draw the small signal model and derive the small signal resistance R_O.

R_O = _____



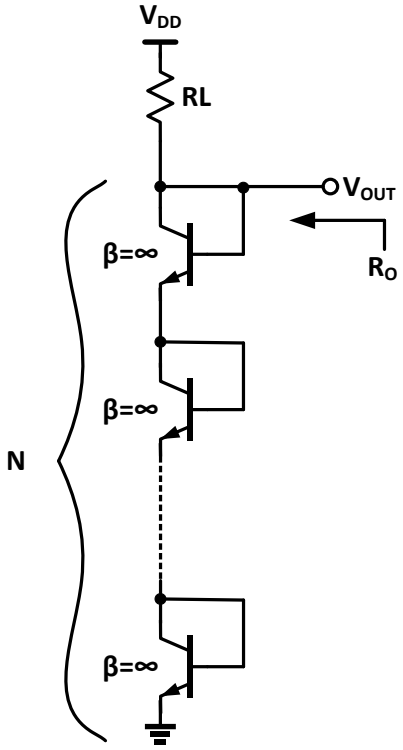
(b) (10 points): For circuit show below, draw the small signal model and derive the small signal resistance R_O.

R_O = _____



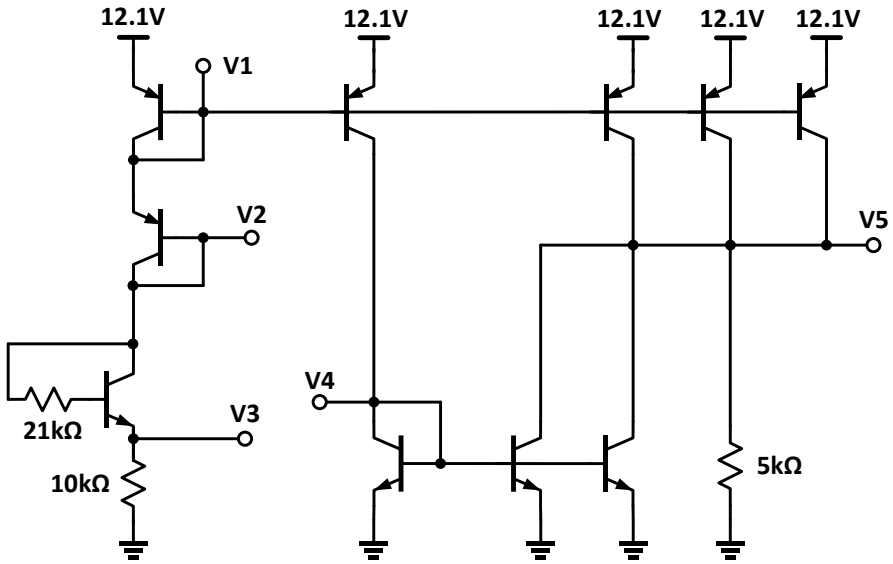
(c) (5 points): For circuit show below, draw the small signal model and derive the small signal resistance R_O.

R_O = _____

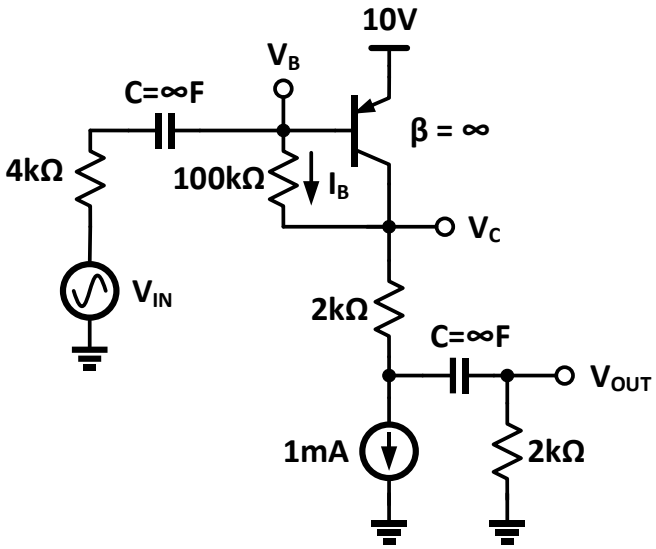


Problem 2: (30 points) For the current mirror circuit shown below, calculate the following voltage values: (Assume $|V_{BE}|$=0.7V ; β=∞; all transistors are identical).

V_1 (5 pts) = _____
V_2 (5 pts) = _____
V_3 (5 pts) = _____
V_4 (5 pts) = _____
V_5 (10 pts) = _____



Problem 3: (30 points) For the amplifier circuit shown below, calculate the amplifier gain V_{OUT}/V_{IN} through small signal analysis (show the complete analysis). Assume $|V_{BE}|=0.7V$



Final Answer