ECE 322 Electronics-1, Fall 2020

Test Date: 11/18/2020

Problems: 3

Total Pages: 7

Name: _____

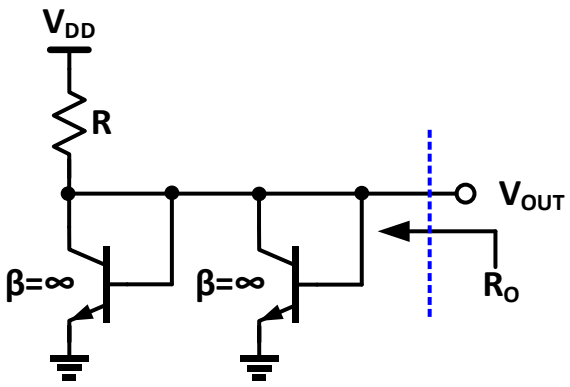
1. **(20 points) _____**
2. **(20 points + 10 Bonus) _____**
3. **(20 points) _____**

Total (60 points) _____

Good Luck!

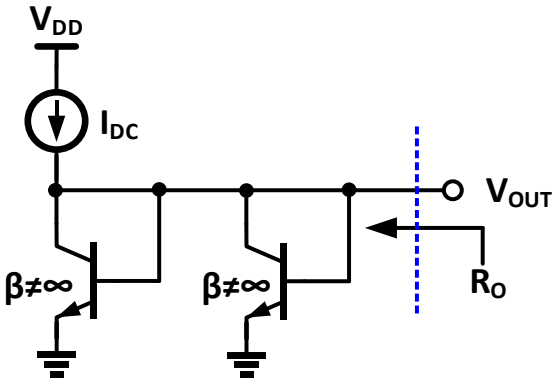
Problem 1 (a) (10 points): For circuit shown below, draw the small signal model and derive the small signal resistance R_O. The current gain **β is infinite**. Both the BJTs are similar. Assume transconductance of both the BJTs = gm.

R_O = _____



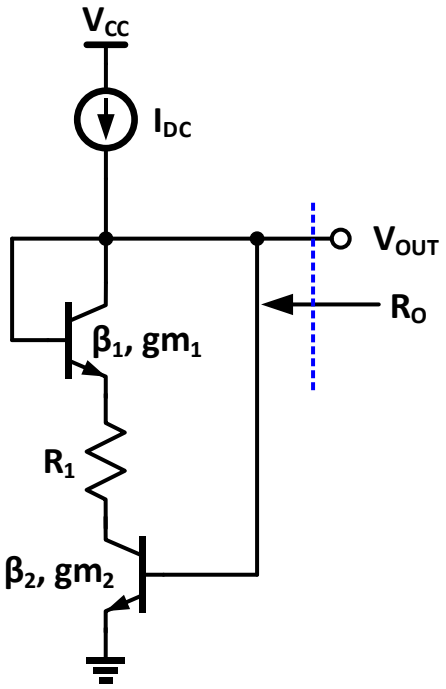
(b) (10 points): For circuit shown below, draw the small signal model and derive the small signal resistance R_O. The current gain **β is finite**. Both the BJTs are similar. Assume transconductance of both the BJTs = gm.

R_O = _____



Problem 2: (20 points) For circuit shown below, draw the small signal model and derive the small signal resistance R_O.

R_O = _____



Bonus (10 points) For circuit shown below, draw the small signal model and derive the small signal resistance R_{IN}.

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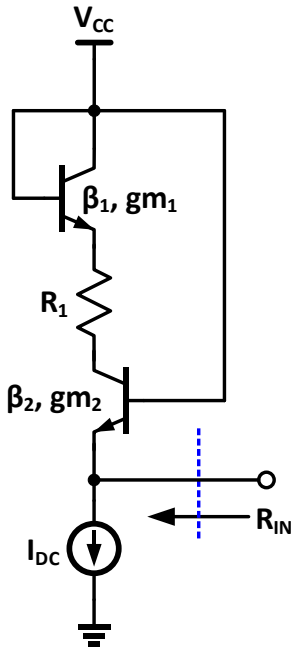
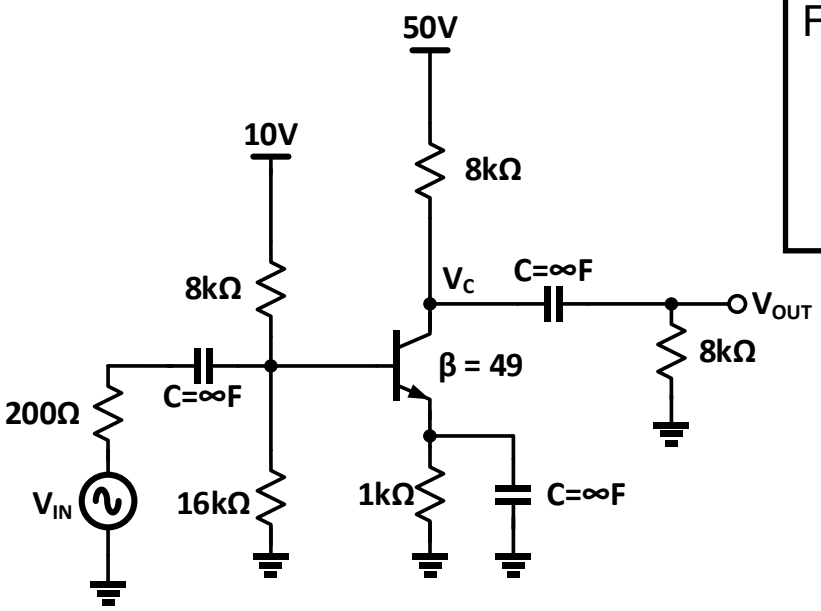
(Note: No partial credit in Bonus Problem)

R_{IN} = _____



Problem 3: (20 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