

EE311 Exp. #3

**Transistor Biasing**

Report #3

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Prepared by

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***CAUTIONARY REMARK: All questions will be answered in the assigned blanks. Don’t use extra place for the answers due to the fact that they are not guaranteed to be evaluated.***

**Part 1--Introduction:** Explain the main objective of the first experiment on your own words. (5pts)

**Part 2--Procedure: a) Biasing:** Why is the correct biasing required and so important for circuits which contains BJT. Which biasing technique as you seen in Experiment 2 is better than others? Why? Explain (15pts) **b)** What are the β, $h\_{fe}$, $h\_{FE}$? Why is the BJT an active component? (10pts)

**b)** Consider Figure.1 below. For Vcc=12V and RB, RC and RB1, RB2 values as you calculated during the experiment, obtain DC operating values of the BJT’s for each biasing configuration in the LT-Spice Simulation by considering BJT model in the appendix part. Compare Spice results with your measurement results. Comment on results. (20 pts)



**Figure. 1**

**c) AC gain**: Plot AC gain of each configuration in Figure.1 using LT-Spice. Compare these results with your measurement results regarding AC gain. (Take input capacitance as 0.1uF.) (35pt)

**Part-3--Conclusion:** Conclude your report with your learning from this experiment on your own words. Moreover, you can discuss or criticize some over-expected or under-expected sides of the experiment. (10pt)

**Part-4--References:** If you have referred parts, specify their references below. (5pt)

***Appendix:***

***BC237 BJT Model Parameters for Spice Simulation:***

.MODEL BC237 NPN (IS=1.8E-14, ISE=5.0E-14, NF=0.9955, NE=1.46, BF=400, BR=35.5, IKF=0.14, IKR=0.03, ISC=1.72E-13, NC=1.27, NR=1.005, RB=0.56, RE=0.6, RC=0.25, VAF=80, VAR=12.5, CJE=13E-12, TF=0.64E-9, CJC=4E-12, TR=50.72E-9, VJC=0.54, MJC=0.33)