Homework 2

1) Draw the I_C vs V_{BE} curve of the npn BJT. From this curve, extract the value of I_S.
2) Draw the I_C vs V_{CE} curves of the npn BJT. From these curves, extract the value of V_A.
3) Draw the β vs I_C curve of the npn BJT. What is the value of I_C for the highest β?
4) Draw the f_T vs I_C curve of the npn BJT. What is the value of I_C for the highest f_T.

Hint: It is not trivial to draw the f_T curve. Search the internet for a methodology or do several simulations for different I_C values and combine the results you read from each on MATLAB or excel.

Date Assigned: October 03, 2018
Date Due: October 19, 2018

Notes: Use the model named BN1X1 as given below. You may use HSPICE or LTSPICE or other SPICE programs for simulations.

For questions, please contact Engin Afacan.

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.MODEL BN1X1 NPN
+ BF=82 IS=7.943E-17 NF=9.9063E-01 NE=1.3893 VAF=71.4
+ IKF=1.025E-02 ISE=8.268E-17 RE=17.4 RC=752.42 RB=1.213E+03
+ RBM=13.08 ISC=1.643E-15 NC=1.0266
+ CJE=0.0976E-12 MJE=0.5050 VJE=0.85 CJC=0.0981E-12 MJC=0.4990
VJC=0.80
+ CJS=0.1800E-12 MJS=0.2033 VJS=0.70
* AREA OF TRANSISTOR
* AE=64 um^2  PE=32 um  AB=336 um^2 PB=80 um AC=1536 um^2 PC=160 um
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