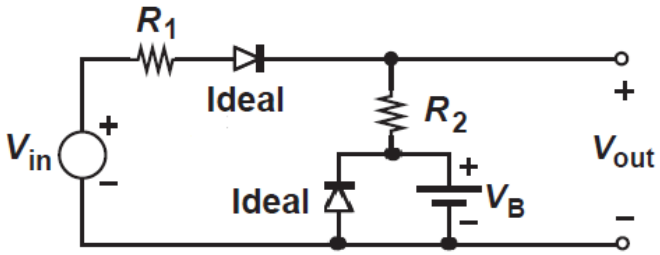
EE304 Microelectronics Homework 2

Due date: 15th, October

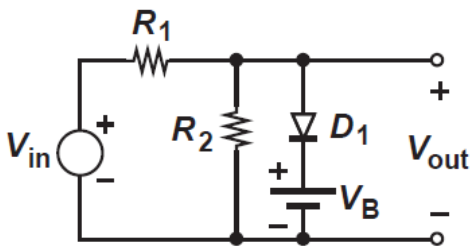
Solve problems below. There are 5 problems, 20 point each.

※ *If problem demands you to plot something, you should write what the axis is, value of slope and special points (eg. min, max, etc) and other particular things needed on the graph. Also, if you drive answer without sufficient explanation, your score on that problem will not be given fully.*

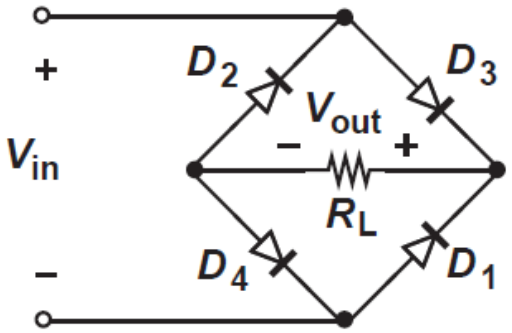
#1. Plot input/output characteristics for the below figure using an ideal model for the diode. Assume $V_X = 5sinwt$, $R_1 = R_2 = 1\Omega$ and $V_B = 3V$



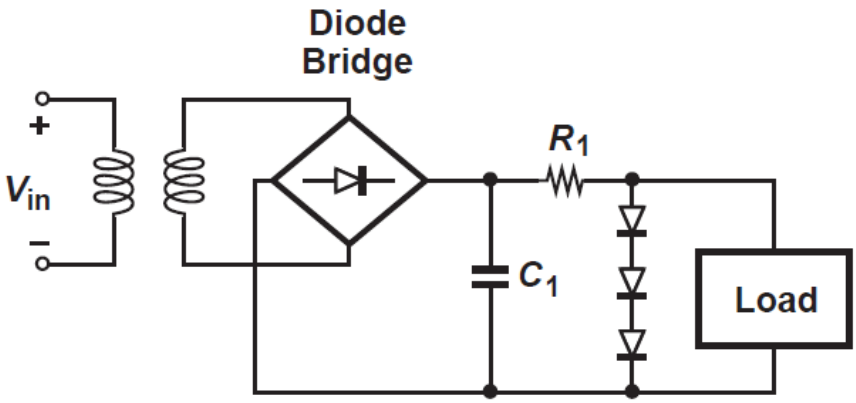
#2. Plot the current flowing through R_1 and D_1 as a function of V_X for the circuit shown below figure assuming a constant-voltage diode model. You should plot two graphs separately.



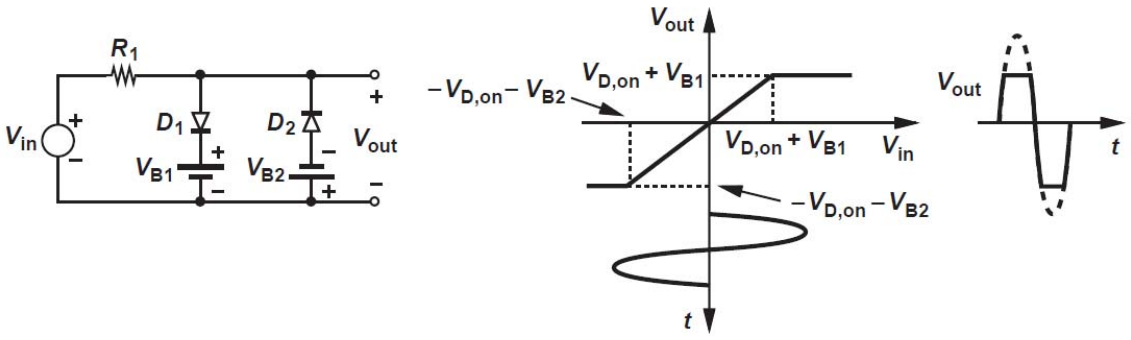
#3. Suppose the negative terminals of V_{in} and V_{out} in below figure are shorted together. Plot the input-output characteristic assuming an ideal diode model and explaining why the circuit does not operate as a full-wave rectifier.



#4. Suppose in below figure, the diodes carry a current of 5mA and the load, a current of 20mA. If the load current increases to 21mA, what is the change in the total voltage across the three diodes? Assume R_1 is much greater than $3r_d$.



#5. Design the limiting circuit of below figure for a negative threshold of -1.9V and positive threshold of +2.2V. Assume the input peak voltage is equal to 5V, the maximum allowable current through each diode is 2mA, and $V_{D.on} \approx$ 800mV.



NOTE

There is no class at 15th, October. Therefore you should submit your homework2 at the entrance of NanoFab center. Like as Homework1 did, there will be a homework box.

Submitting late is NOT acceptable. Also, you should write all your answers in English.