American University of Beirut

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

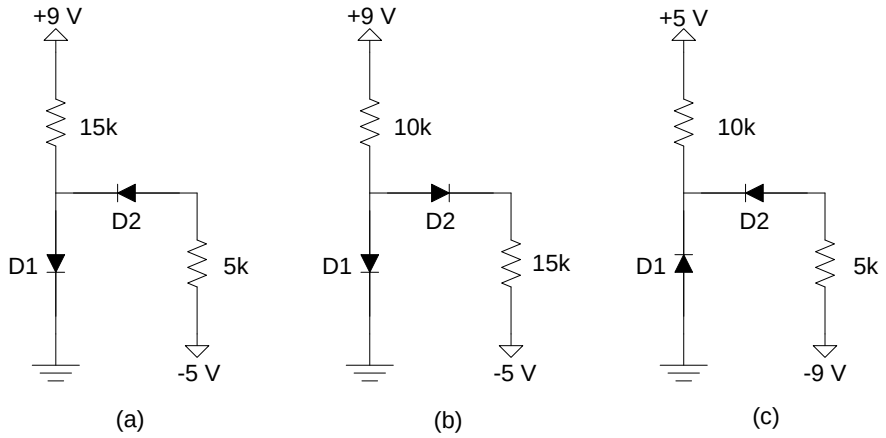
EECE 310 – Electronics Fall 2011 – 2012

Due Wednesday October 12, 2011 at 9:00 am

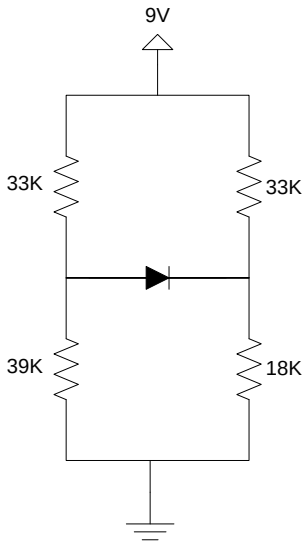
Homework 2

1. [10 points] A junction diode operating at a temperature of 37 degrees C is conducting a current of 0.33 mA, and has $n = 1.2$.
(a) **[5 points]** What is the value of I_S for this diode if the diode voltage is 0.777 V?
(b) **[5 points]** What is the *change* in the diode voltage if the current increases by a factor of 1000?

2. [60 points] Find the operating point (I_D, V_D) for the diodes in the circuits shown below. Assume that all the diodes are *ideal*. **[5 points for the I_D value per diode, 5 points for the V_D value per diode].**



3. [30 points]
a. **[10 points]** Assume that the diode in the circuit below is *ideal*. Find the operating point (I_D, V_D) of the diode. *Hint*: Use the Thévenin equivalent circuit.



b. Repeat part (a) for a real diode at a temperature of 27 degrees C with n = 1.2 and $I_S = 10^{-14}$ A, using:

i. **[10 points]** Iterations with an initial guess for I_D equal to the value found in part (a)

ii. **[10 points]** The graphical load line method.