King Fahd University of Petroleum & Minerals
Electrical Engineering Department
Fall 2011 (102)

EE 203 – Exam I
Saturday, March 19, 2011
6:30-8:00 PM

| Name	
ID	

	Dr. Oualid	Dr. Al-Gahtani	Dr. Al-Zaher	Dr. Wessam
Section	1 , 2	3, 6	4 , 5	7 , 8

Problem	Grade
1 (35 points)	
2 (30 points)	
3 (35 points)	
Total (100 points)	

Question 1:

It is required to use a bridge peak-rectifier (as shown below) to design a dc power supply that provides an average dc output voltage of 10V with maximum ripple voltage of 1.2V (peak to peak). The diodes available have 0.7V drop when conducting.

a) Find the peak value of the transformer secondary output (v_S)   (10 points)
b) Determine the transformer turns ratio to provide the necessary secondary voltage   (8 points)
c) Find the required value of the filter capacitor.   (10 points)
d) Find the diode peak inverse voltage (PIV).   (7 points)
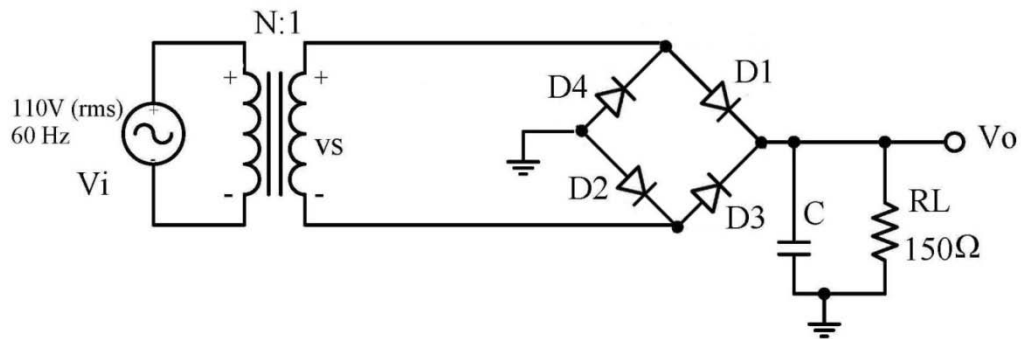
Question 2:
For the shown diode circuit, use the constant voltage drop model with $V_D = 0.7V$ and assume that the zener diode has Vz=3.6V and rz=0 Ω.

a) Draw the voltage transfer characteristics (Vo versus Vi) to cover the input range ±10V. **(10 points)**
b) If the input is a sinusoidal waveform with peak value of 10 V. Draw Vo vs. time for one period. **(10 points)**
c) Redraw the voltage transfer characteristics (Vo versus Vi) if RL=1kΩ is connected to the circuit output. **(10 points)**

(Label all the critical voltage levels)
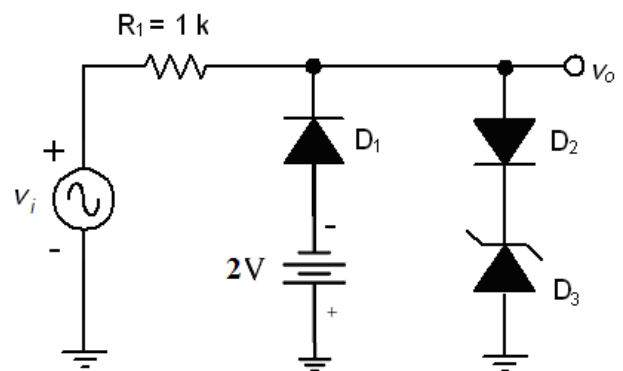
Question 3:
For the circuit shown below, the two transistors are identical with parameters
$k'_n \dfrac{W}{L} = 2\ mA/V^2$ and $\lambda = 0$. If the voltage V_1 was measured to be 2.44 volts determine

  a) The labeled voltage V_2 **(15 points)**

  b) The threshold voltage V_t **(10 points)**

  c) The mode of operation of each transistor (Verify your answer).   **(10 points)**