ECE 322 Electronics-1, Fall 2018

Test Date: 10/24/2018

Problems: 4

Total Pages: 6

Name: _____

1. (10 points) _____

2. (20 points) _____

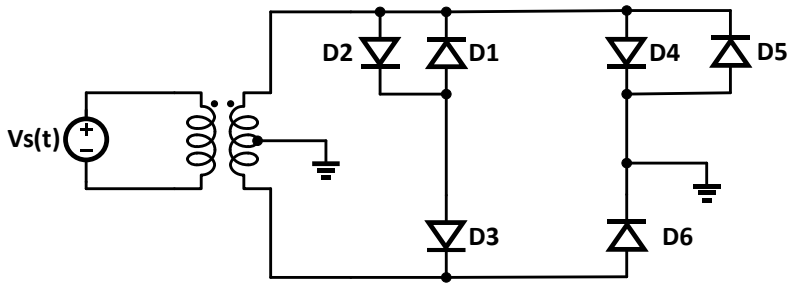
3. (30 points) _____

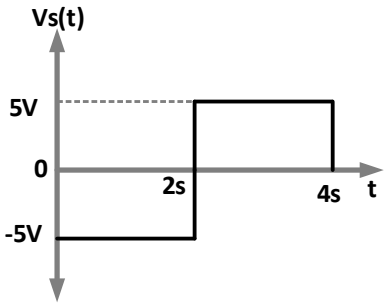
4. (30 points) _____

Total (90 points) _____

Good Luck

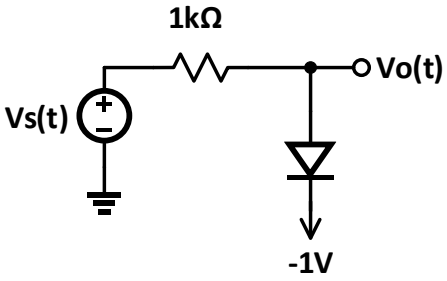
Problem 1: (10 points) A circuit with 6 diodes is shown below along with the waveform of the input source. Assume **ideal diodes** answer the following:

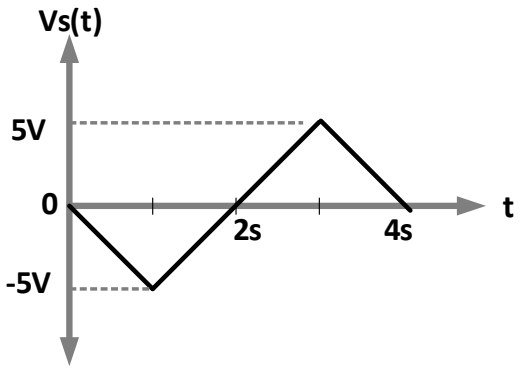




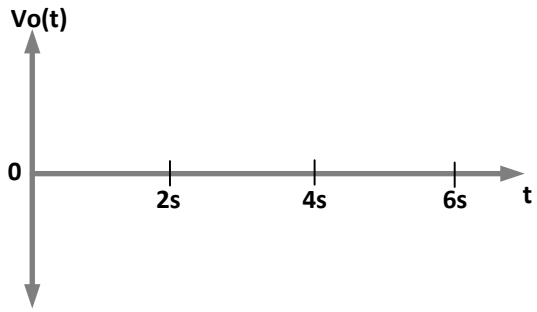
1(a): Write the diodes which are turned on during time 0s to 2s.	**1(b):** Write the diodes which are turned on during time 2s to 4s.

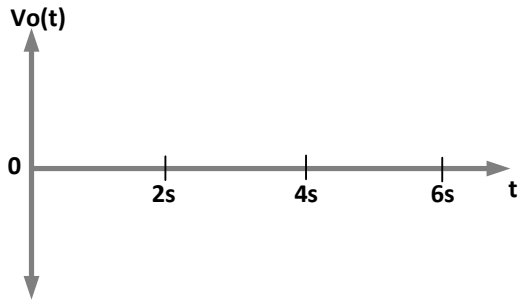
Problem 2: (20 points) A circuit with one diode is shown below along with the waveform of the input source.





2(a): Assume idea diode, draw the waveform at node Vo	**2(a):** Assume diode drop in forward bias is 1V, draw the waveform at node Vo.





Problem 3: (30 points)

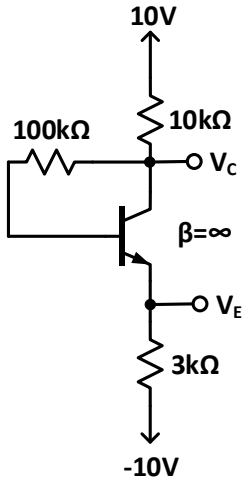
(a) For a npn transistor, the emitter current I_B is 10μA and the value of α=0.99. Calculate the following quantities:

Emitter Current (I_E) = _____
Collector current (I_C) = _____
Current Gain (β) = _____

(b) For the circuit shown below, assume $|V_{BE}|$ = 0.7V, calculate the following quantities:

V_C = _____

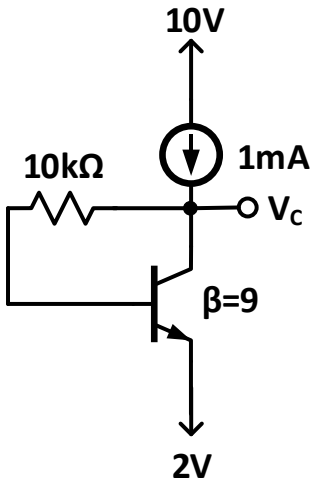
I_E = _____



(c) For the circuit shown below, assume $|V_{BE}| = 0.7V$, determine the region of operation for the transistor (cutoff, active, or saturation) and calculate Vc

Region of Operation = _____

V_C = _____



Problem 4: (30 points) For the circuit shown below $|V_{BE}| = 0.7V$ and $V_E=1V$, calculate the voltages V_C and V_B; calculate currents I_C and I_B; calculate β and α;

V_C = _____
V_B = _____
I_C = _____
I_B = _____
β = _____
α = _____