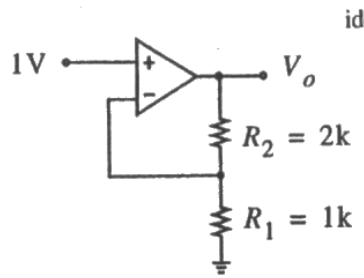
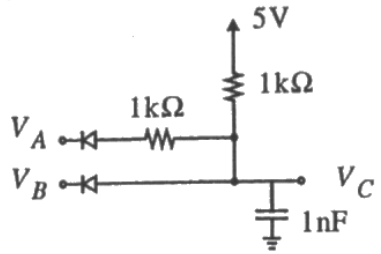
Question #1 missing

[5] Question 2:



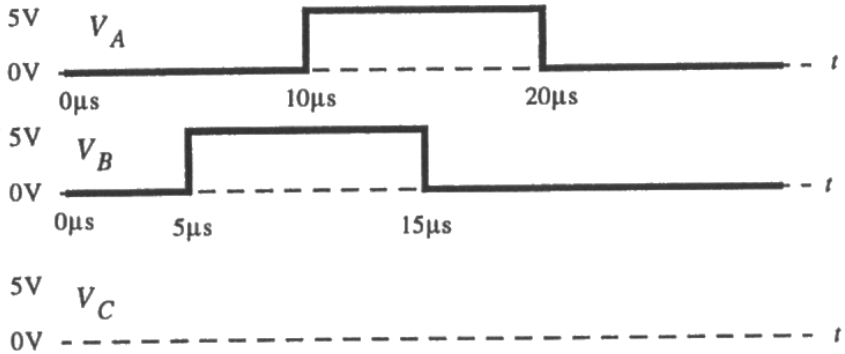
For the above circuit, find the output voltage, V_o

[5] Question 3:

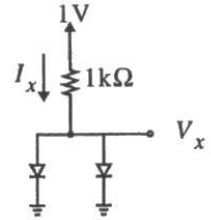


Use the 0.7V constant voltage drop model for the diodes.

Sketch the resulting waveform for V_C on the graph below and label important voltages and important time constants.



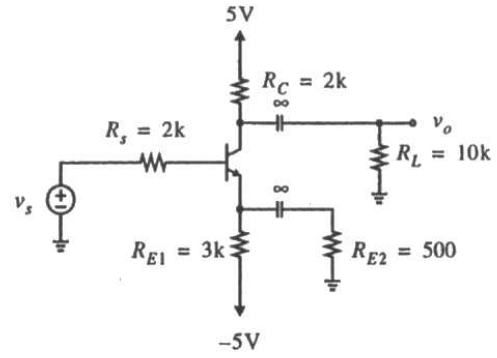
[5] Question 4:



Use the exponential model for the diodes.

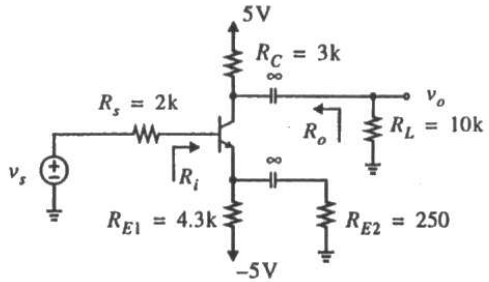
Consider the circuit above where the two diodes are identical. Given that **each** diode would have a current of 2mA at a voltage of 0.7V and that its voltage drop changes by 0.1V for every decade change in current, find the current, I_x and the voltage, V_x.

[5] Question 5:



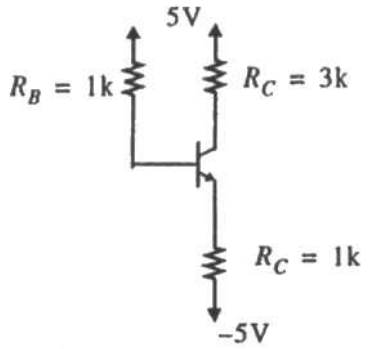
For the above transistor circuit, find the values of the collector current, base voltage, collector voltage and emitter voltage. Assume β = 100 and ignore any finite output resistance.

[5] Question 6:



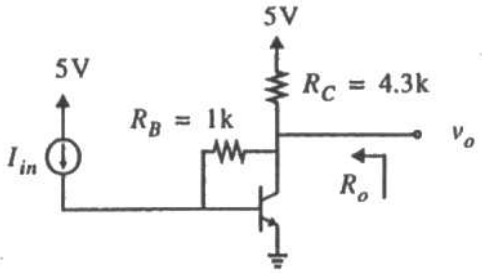
For the above transistor circuit, the collector current was found to be 1mA and the transistor is operating in the active region. Using small-signal analysis, find the gain, v_o/v_s, input resistance, R_i and output resistance, R_o. Assume β = 100 and ignore any finite output resistance.

[5] Question 7:



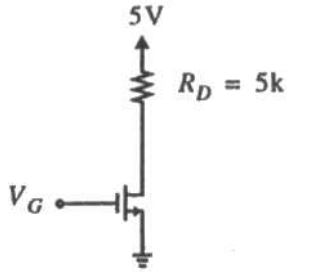
For the above circuit, find V_B, V_C and V_E. Assume $\beta = 100$ and ignore finite output resistance.

[5] Question 8:



The above is a transimpedance amplifier (used in photodetectors). Find the output resistance, R_o. Assume $\beta = 100$ and ignore finite output resistance.

[5] Question 9:



V_t = 1V
$\mu_n C_{ox}$ = 20uA/V
W = 10um
L = 1um

For the above circuit, find the value of V_G where the transistor is at the edge of the triode region.