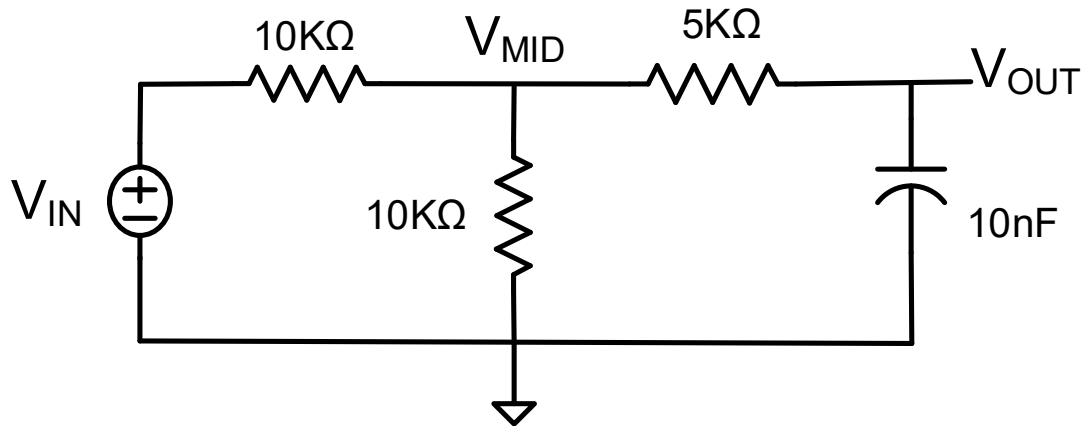


## Lab 2 Prelab: Cadence® Custom IC design tools - Setup, Schematic capture and simulation (To be completed before start of lab)



For the circuit shown above, answer the following questions. For some of the questions you may not be able to easily obtain an exact solution analytically. In these cases describe or sketch what type of response you would expect giving approximate or anticipated numerical characteristics.

1. What is the function of the circuit?
2. What is the Thévenin equivalent resistance seen by the capacitor?
3. (dc analysis) If a dc voltage is applied at  $V_{IN}$ , what would be the dc voltage at the  $V_{OUT}$  node? At the  $V_{MID}$  node?
4. (ac analysis) What is the -3dB corner frequency of the circuit? For simulations, what start and stop frequencies would you choose in order to observe the frequency band of interest for obtaining the -3dB frequency by simulations?
5. (transient analysis) What is the response of the circuit to a step voltage of 1V supplied at  $V_{IN}$ ?
6. (transient analysis) Assume a pulse with finite magnitude, finite but very fast rise time, finite but very fast fall time, and non-zero pulse width is to be applied to the circuit. The pulse should be wide enough so that the circuit nearly reaches a steady state value before the falling edge of the pulse occurs. Determine the parameters of the input pulse in order to easily observe the response of the circuit to the rising and falling transitions of the pulse. How long would you need to run a transient analysis to characterize how the circuit responds to a pulse input?