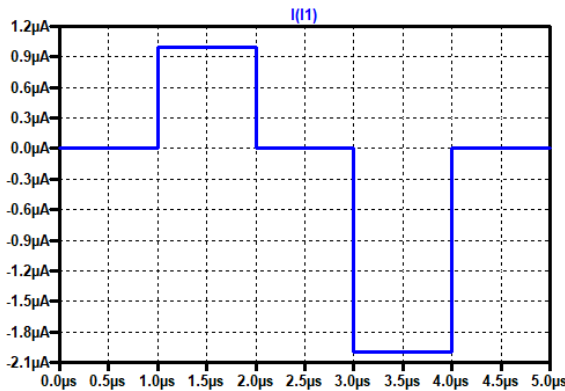
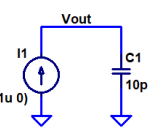


Show your work for credit!

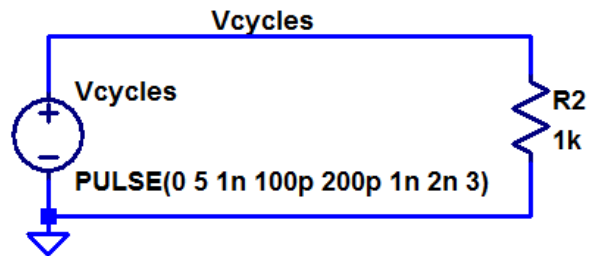
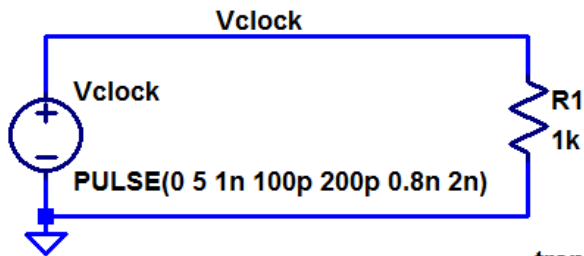
- Suppose a 1.0  $\mu\text{F}$  capacitor is charged to 2 V. How much charge is stored on the capacitor? (1 point)
- The following current is used to charge a 10 pF capacitor. Sketch the voltage across the capacitor and the charge stored on the capacitor against time (show your hand calculations, no hand calculations, no credit). Verify your answer with LTspice. Note that the current seen in this figure can be generated using the piece-wise linear (PWL) source, see example below (make sure you understand how to use a PWL source). (4 points)



PWL(0 0 1u 0 1.001u 1u 2u 1u 2.0001u 0 3u 0 3.001u -2u 4u -2u 4.001u 0)  
.tran 5u



- Suppose that a constant current source,  $I$ , is used to *discharge* a capacitor,  $C$ . What will the voltage across the capacitor look like? Why? Provide an example using LTspice to support your answer. (3 points)
- Repeat problem 3 if the constant current source is *charging* the capacitor. (2 points)
- In your own words explain what each of the parameters mean in the following pulse statements. (2 points)



.tran 10n

- Suppose you are doing a sim where you need a clock signal operating at 10 MHz that oscillates between 0 V and 5 V. Assume the duty cycle of the clock is 50% (the clock signal is high [= 5 V] the same amount of time that the clock is low [= 0V]). Assume the rising and falling edges are 10 ns. Show how to implement this clock signal in LTspice. (2 points)