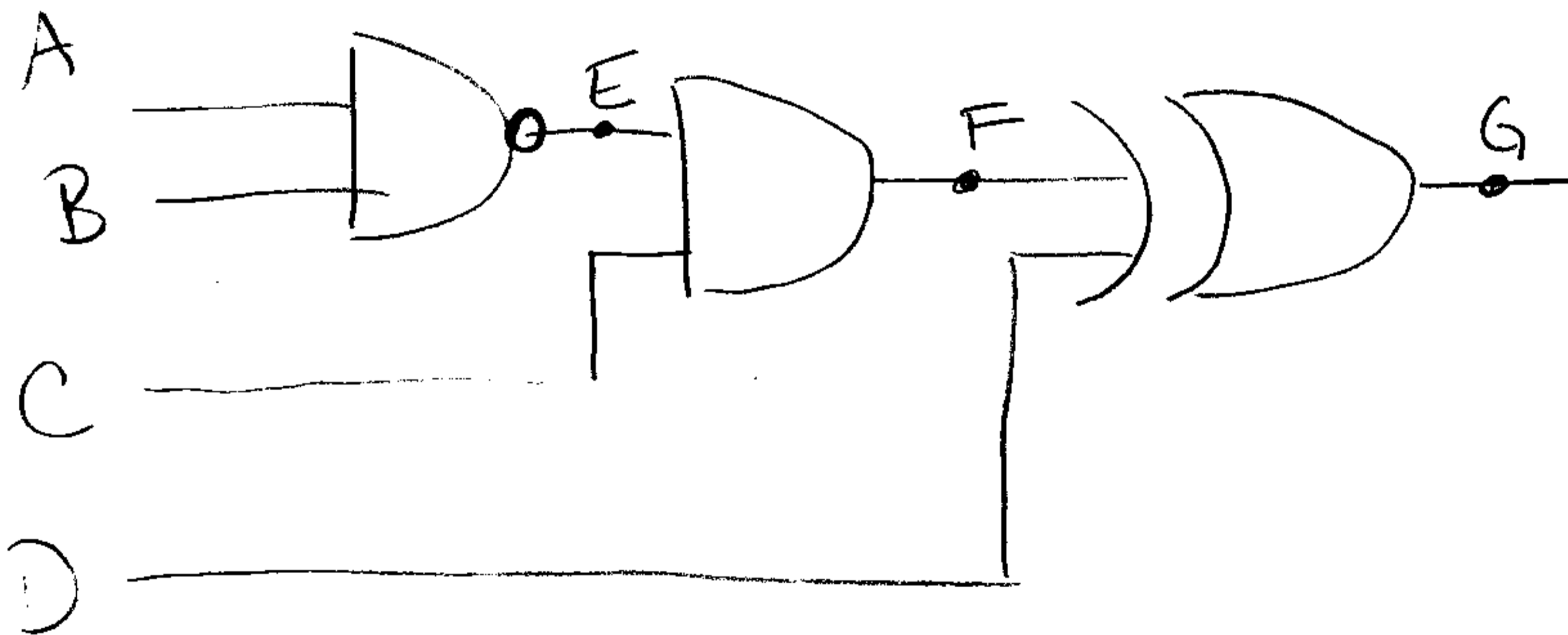


## Problem 1:

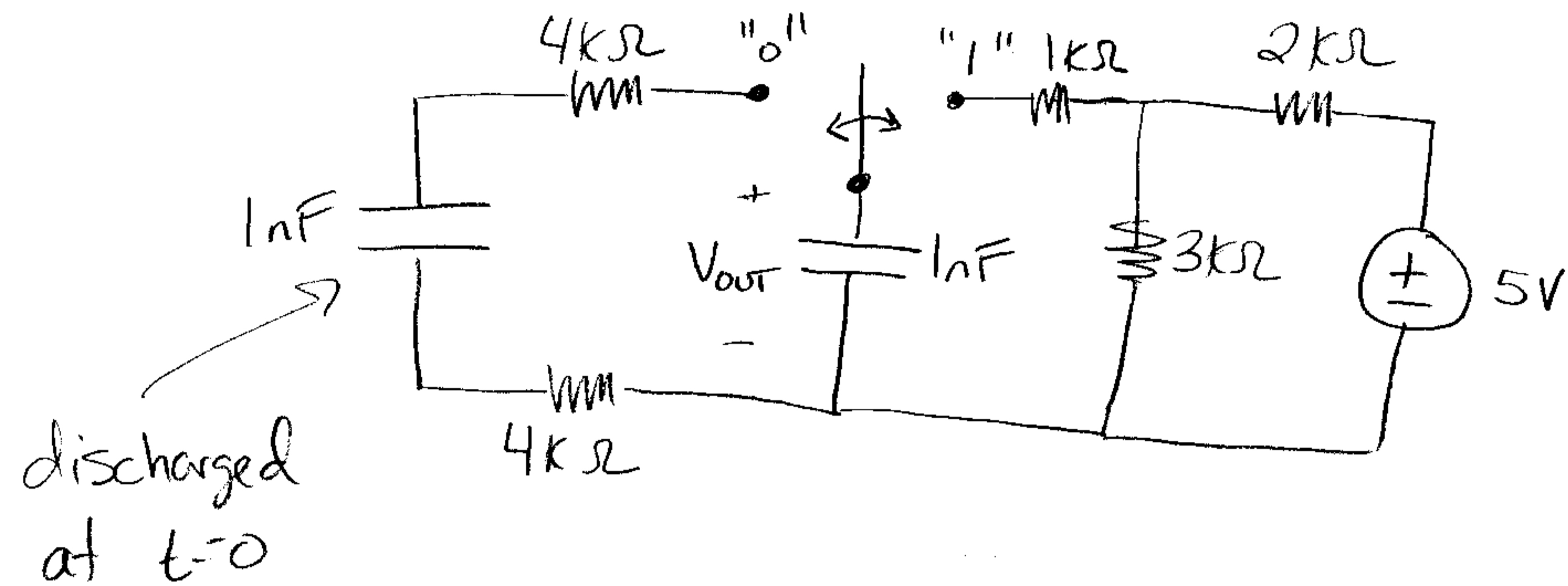
Suppose that each logic gate in the circuit below has propagation delay  $t_p$  (all equal).

Suppose also that  $A$ ,  $B$ ,  $C$ , and  $D$  all go from logic 0 to logic 1 at  $t=0$ .

Draw the signals  $E$ ,  $F$ , and  $G$ .

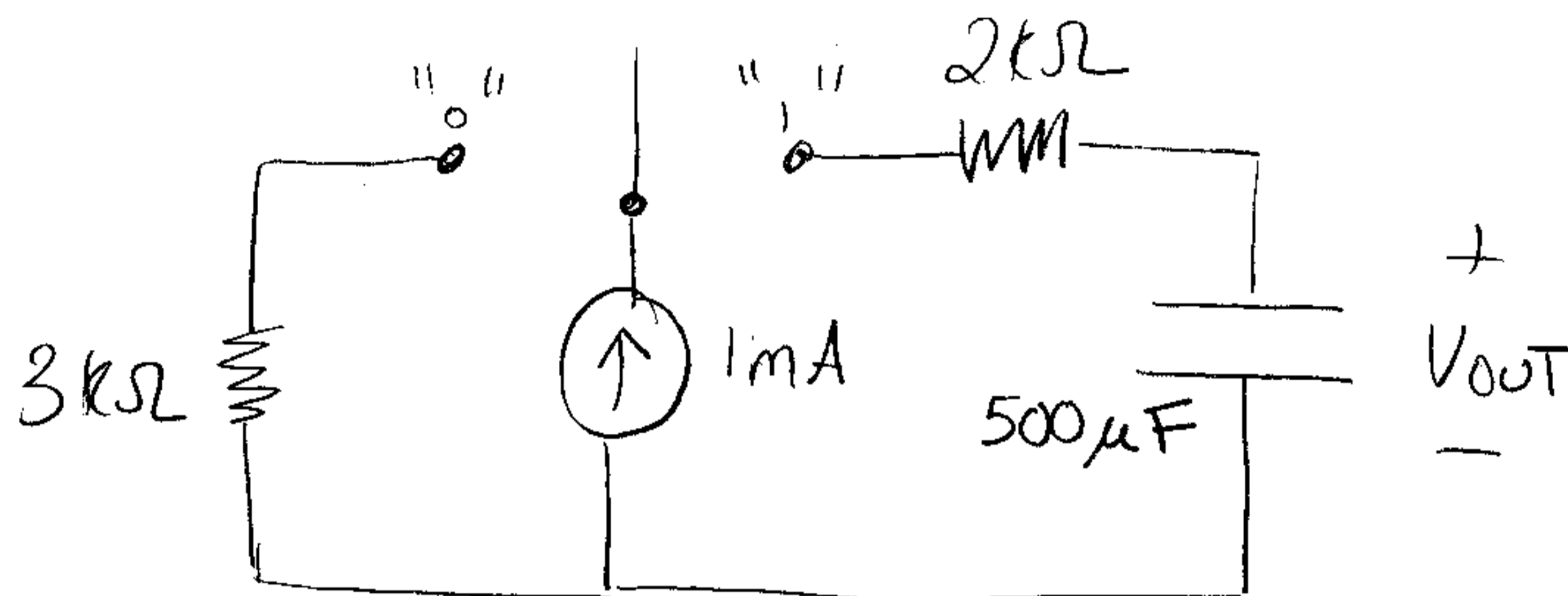


## Problem 2:



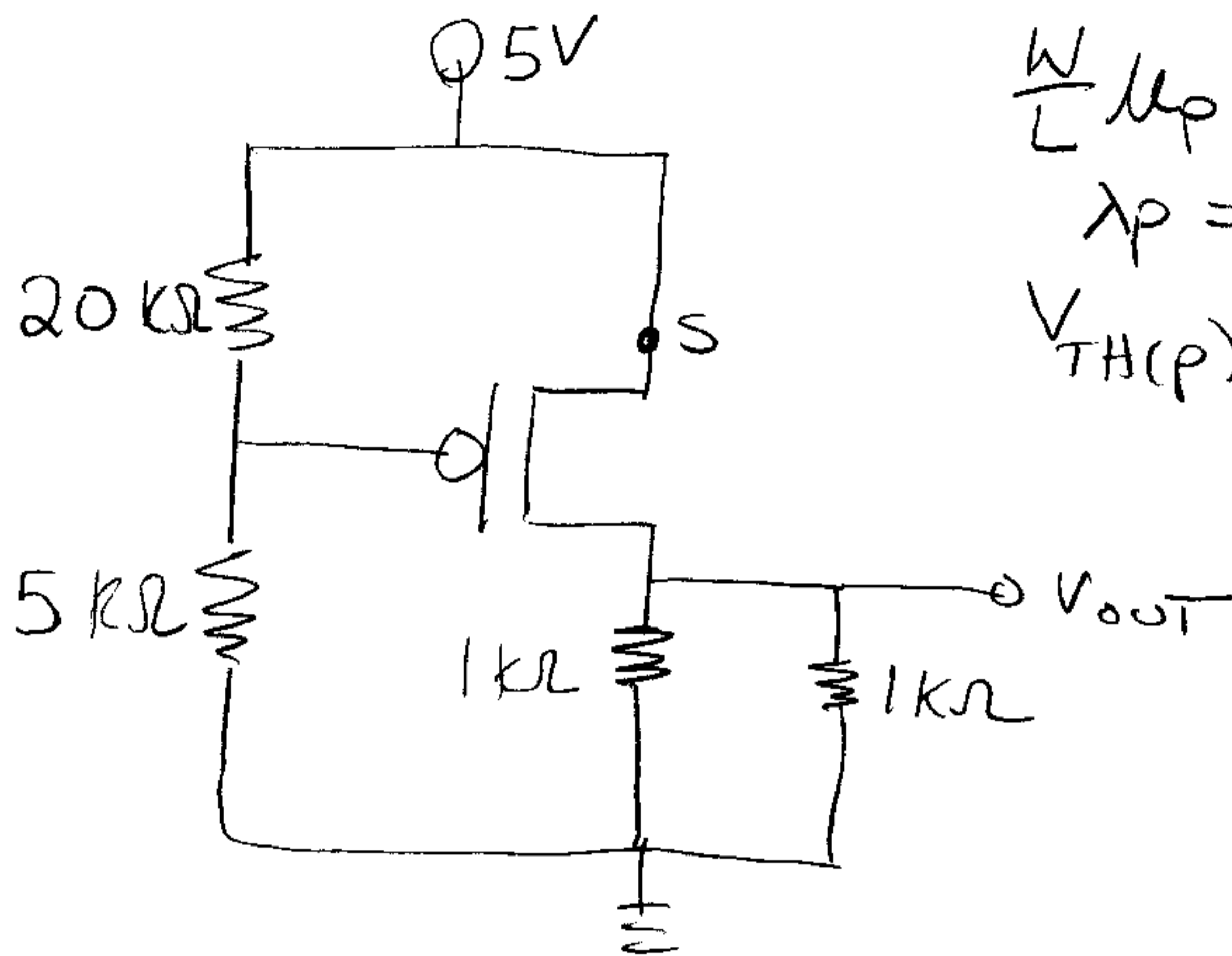
Suppose the switch has been in position "1" for a long time. It switches to position "0" at  $t=0$  and then switches back to "1" at  $t=8\mu s$ . Find  $V_{out}(t)$  for  $t \geq 0$ .

### Problem 3:



Suppose that  $V_{\text{out}}(0) = 1\text{V}$ .  
The switch has been in position "0" for a long time, then switches to position "1" at  $t=0$ , then back to position "0" at  $t=3\text{s}$ .  
Find  $V_{\text{out}}(t)$  for  $t \geq 0$ .

# Problem 4°



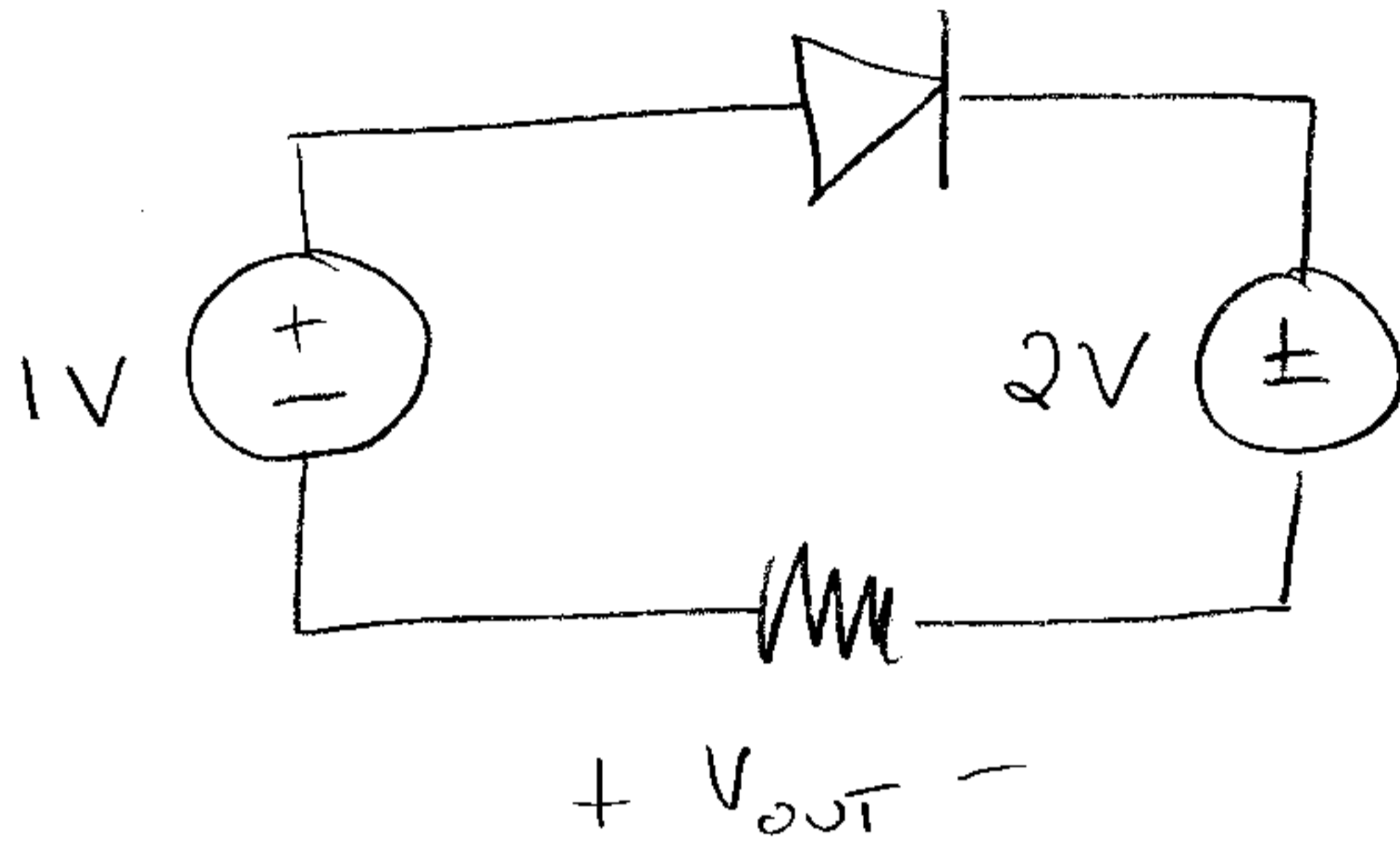
$$\frac{W}{L} \mu_p C_{ox} = 2 \text{ mA/V}^2$$

$$\lambda_p = 0$$

$$V_{TH(p)} = -1 \text{ V}$$

Find  $V_{out}$ .

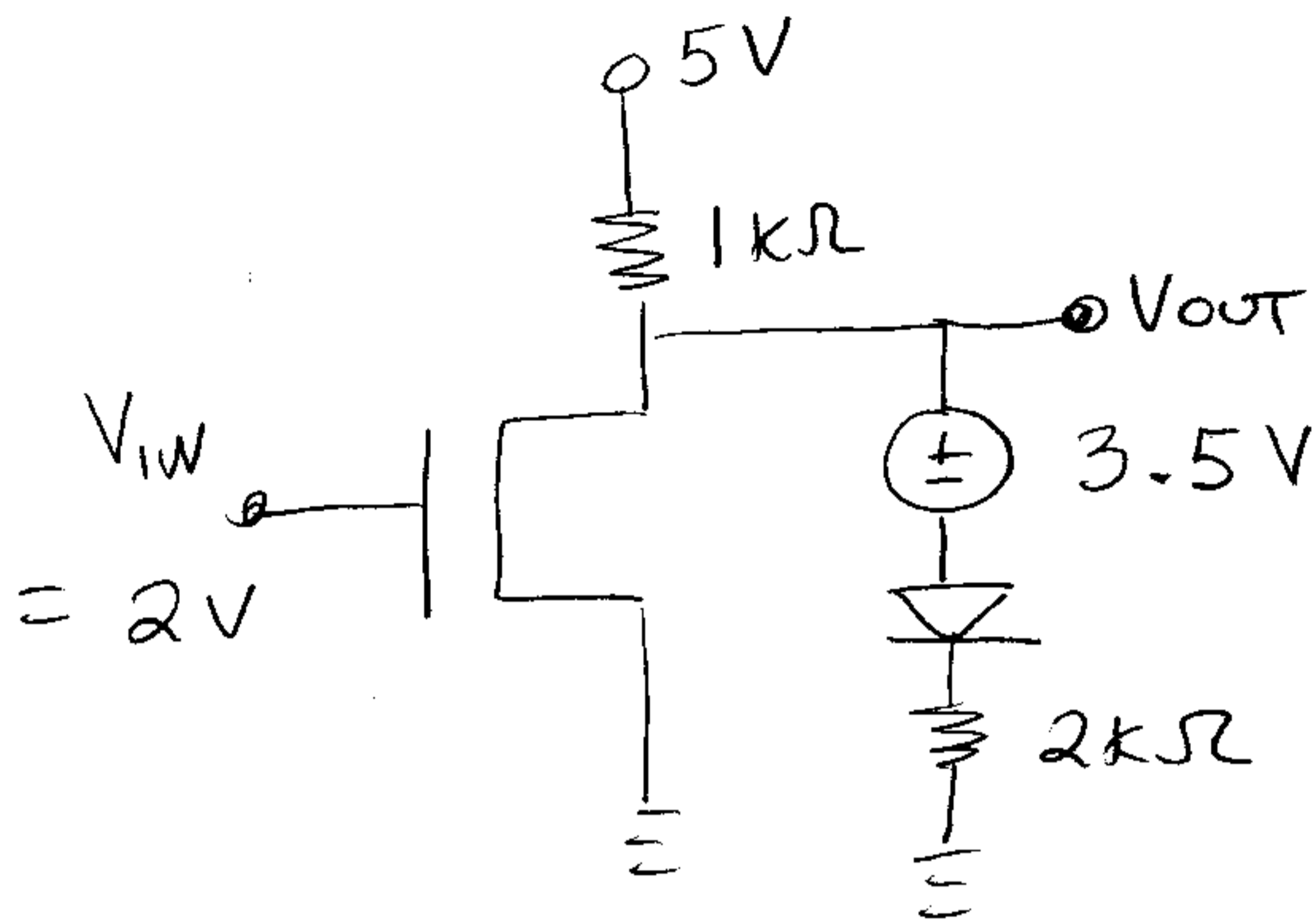
Problem 5



$$V_F = 0.7V$$

Use large-signal  
model for diode.

# Problem 6:



Find  $V_{out}$ .

Use large-signal model for diode  
 $V_F = 2V$ ,

$$\frac{W}{L} \mu_n C_{ox} = 1 \text{ mA/V}^2$$

$$\lambda_n = 0 \text{ V}^{-1}$$

$$V_{TH(N)} = 1V$$