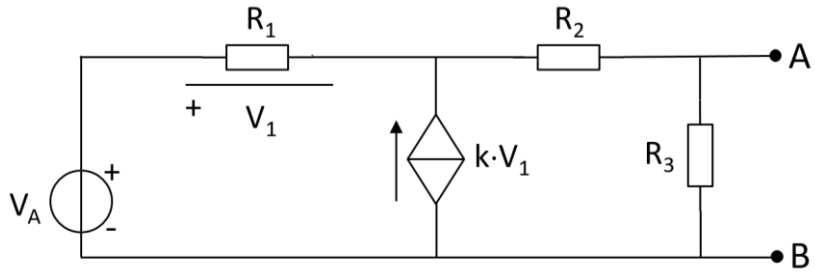
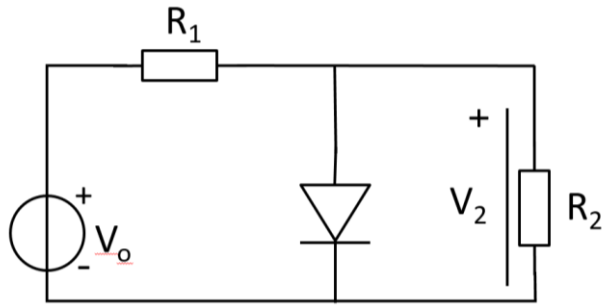
## Home Assignment 3, IE1206 & IF1330, VT2020

### Problem 1



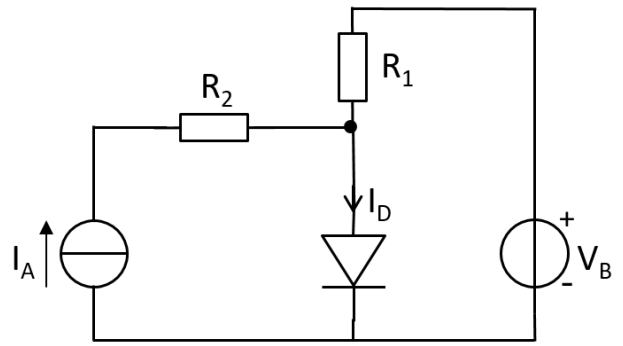

Determine the Thévenin resistance $R_{TH}$ seen at A-B assuming that $R_1$, $R_2$, $R_3$, $V_A$ and k is known.

### Problem 2



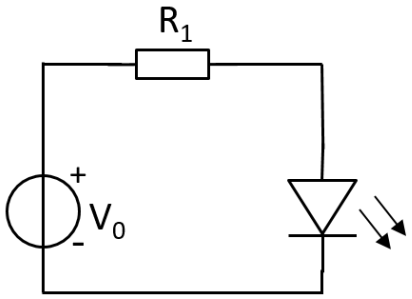

The diode has the forward voltage drop $V_T$ of 0.7 V and $R_1=R_2$.
Determine the voltage $V_2$ when
a) $V_o=1$ V b) $V_o=2$ V c) $V_o=3$ V.

### Problem 3



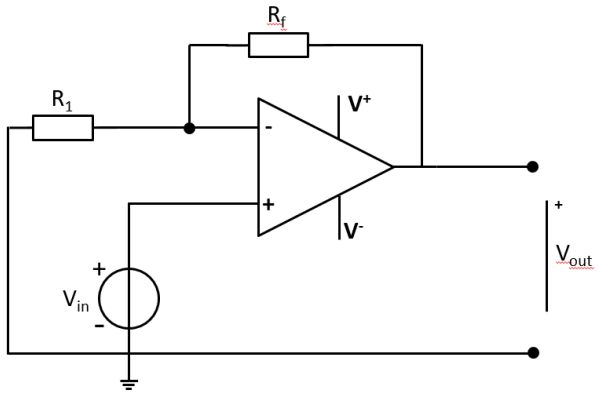

Determine the current $I_D$ in the silicon diode. $V_T$ of the diode is 0.7 V.
$V_B=0.5$ V, $R_1=R_2=1$ kΩ. $I_A=1$ mA

**Problem 4**




How much power is consumed in the light emitting diode? The diode emits red color light and has a forward voltage drop of 2 V. $R_1$=1 kΩ and $V_0$=5 V.

**Problem 5**




Assume that the ideal operational amplifier operates in its linear region. With $R_1$ and $R_f$ known , derive an expression for $V_{out}$ as a function of $V_{in}$

**Problem 6**

$R_1$=1 kΩ and $R_f$=3 kΩ for the circuit in problem 5.
The supply voltage to the op-amp is $V^+$=12 V och $V^-$=-12 V with respect to ground.
What is $V_{out}$ if:

a) $V_{in}$=2 V

b) $V_{in}$=5 V