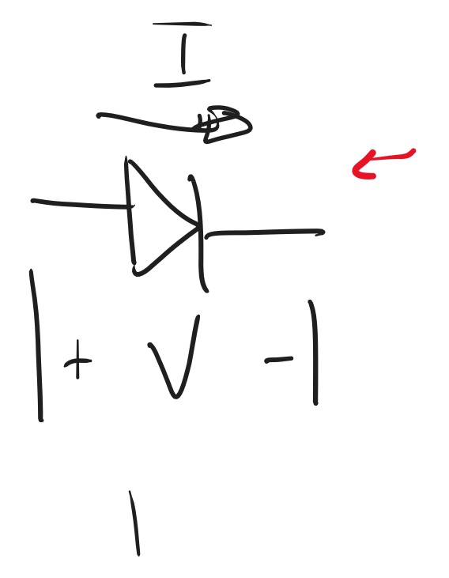
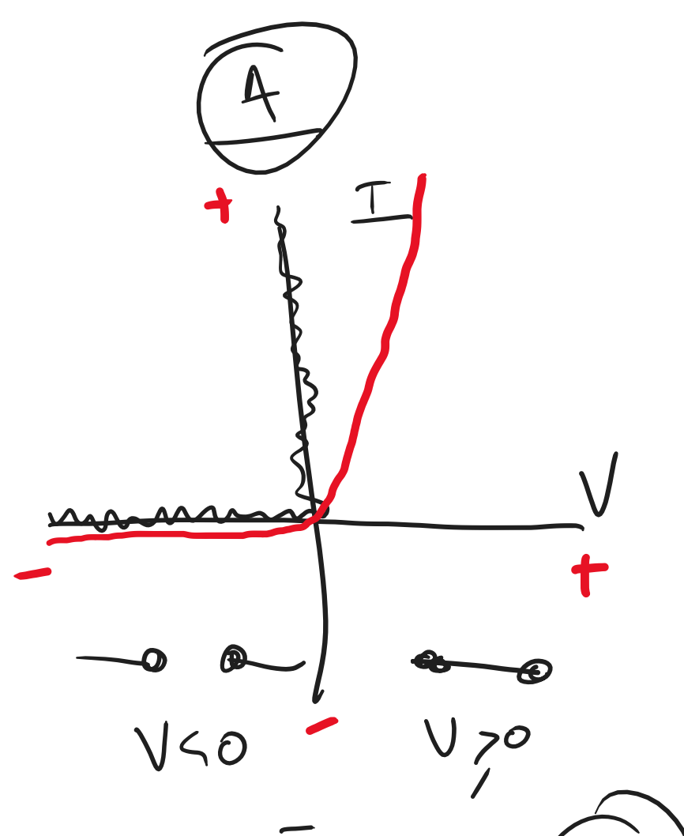
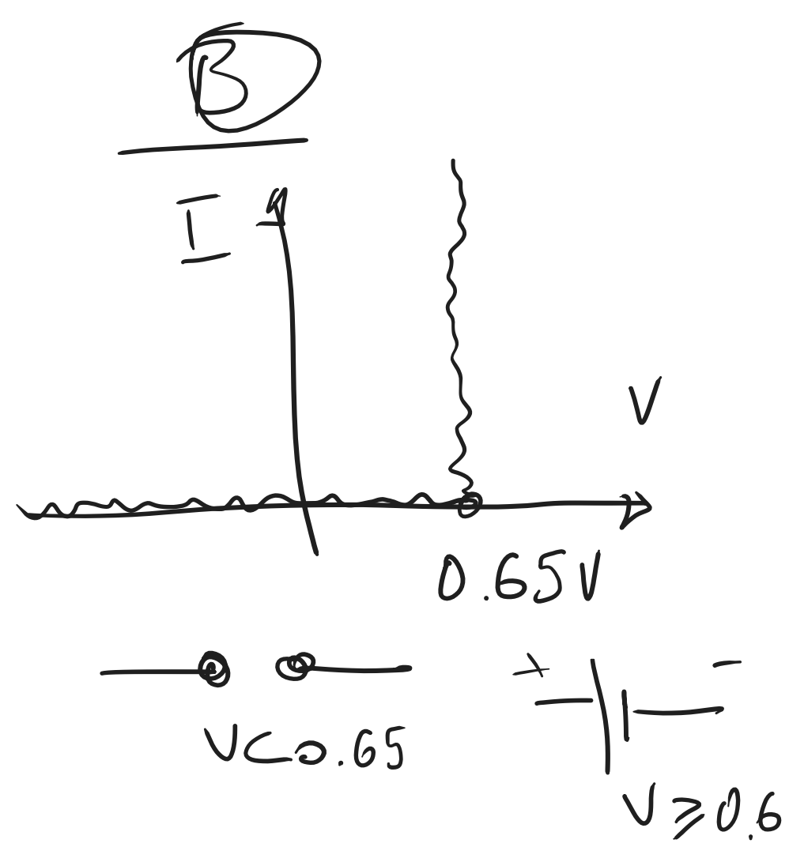
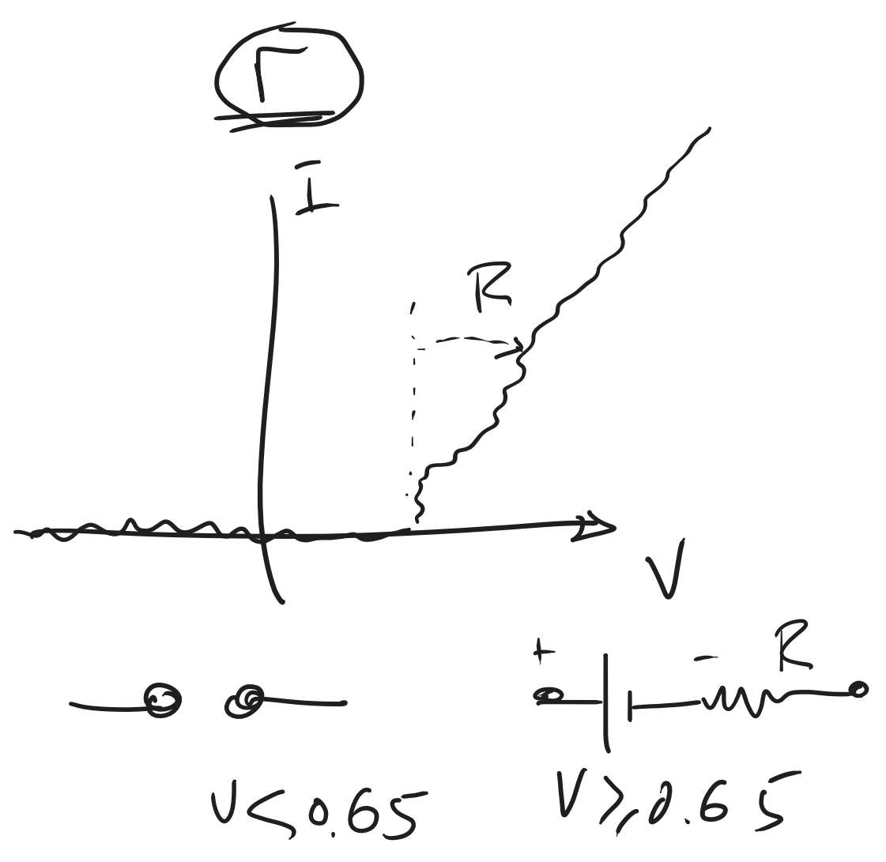
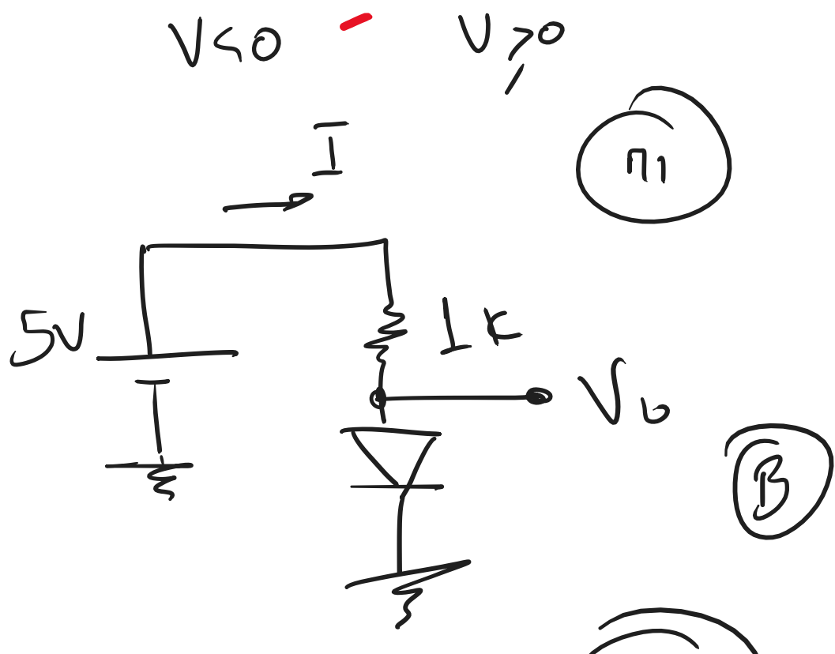
ΠΡΟΣΕΓΓΙΣΗ ΛΕΙΤΟΥΡΓΙΑΣ ΔΙΟΔΩΝ







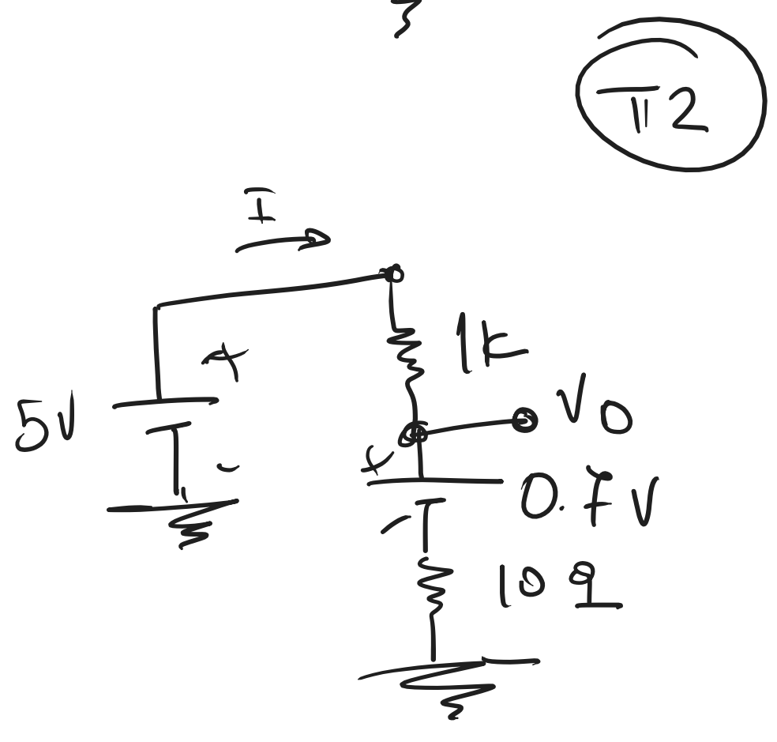




$V_o = 0.7V = 700mV$

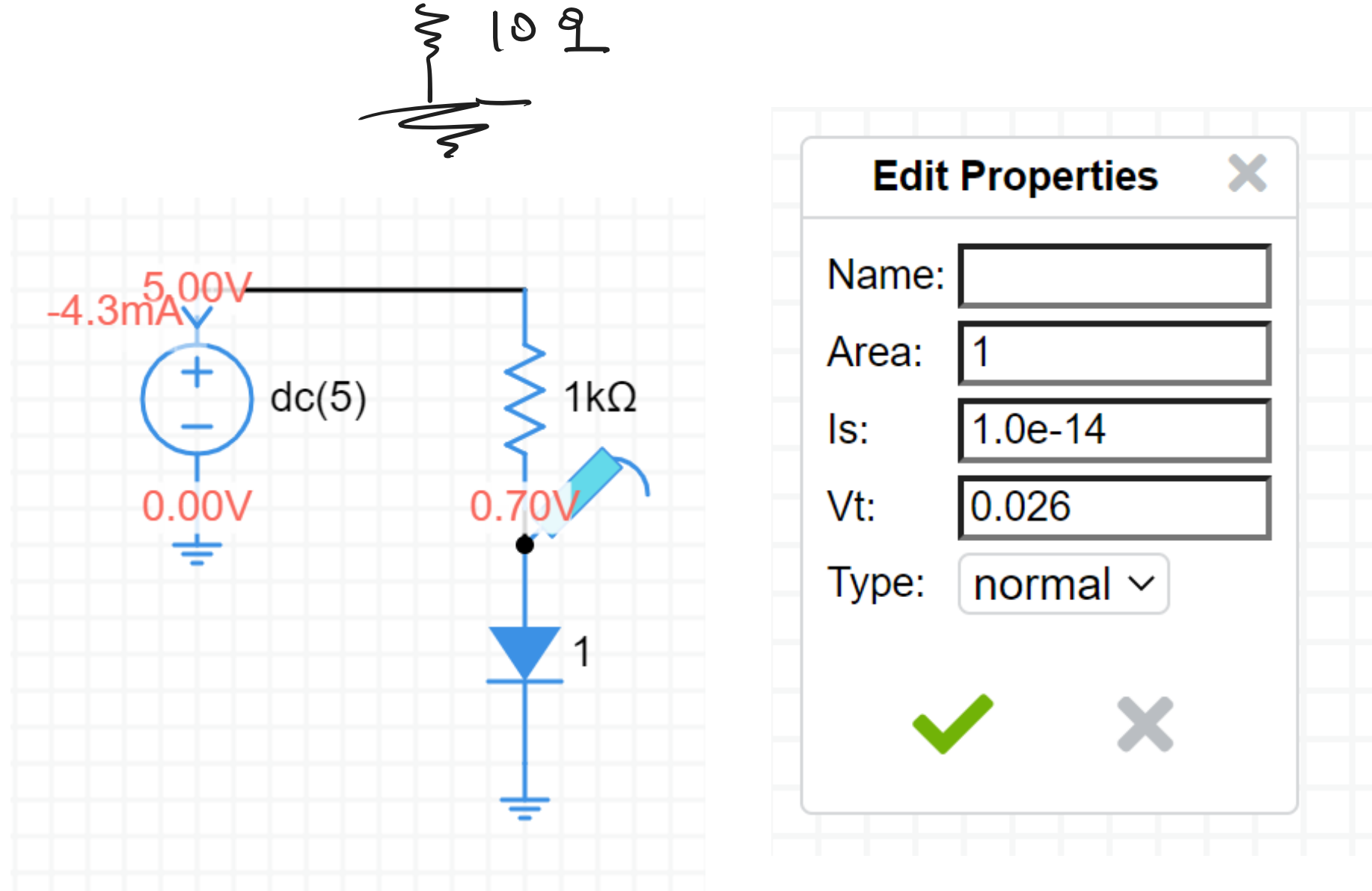
$\text{Β} \rightarrow I_B = \frac{5V - 0.7V}{1k\Omega} = \underline{4.3mA}$

$I_A \overset{\text{Α}}{=} \frac{5V}{1k\Omega} = \underline{5mA}$



$I_r = \frac{5 - 0.7V}{1010\ \Omega} = \frac{4.3}{1010} = \underline{4.257\ mA}$

$V_o = 10\Omega \times 4.257mA + 0.7V = 42.57mV + 700mV = \underline{742.57mV}$

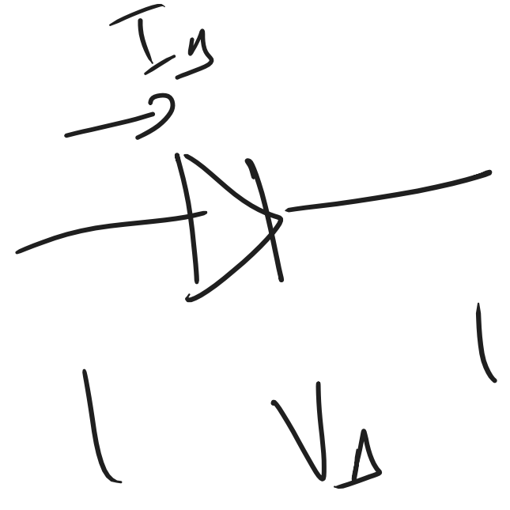


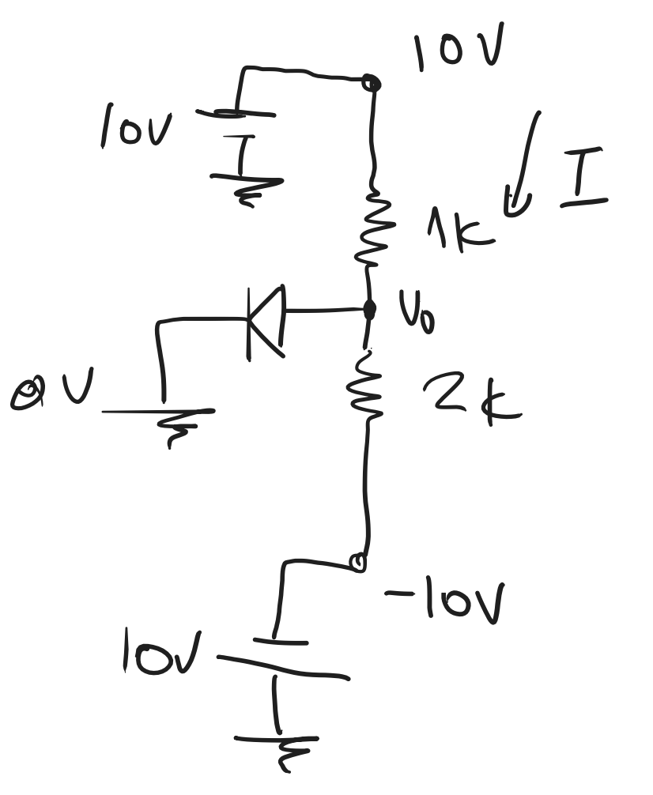
Edit Properties ✕

Name:
Area: 1
Is: 1.0e-14
Vt: 0.026
Type: normal

✓ ✕

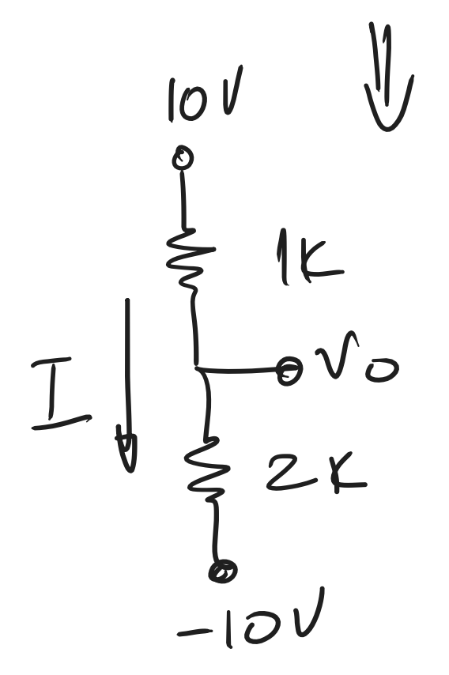
$$I_D = I_S \left[e^{\frac{V_D}{nV_t}} - 1 \right]$$





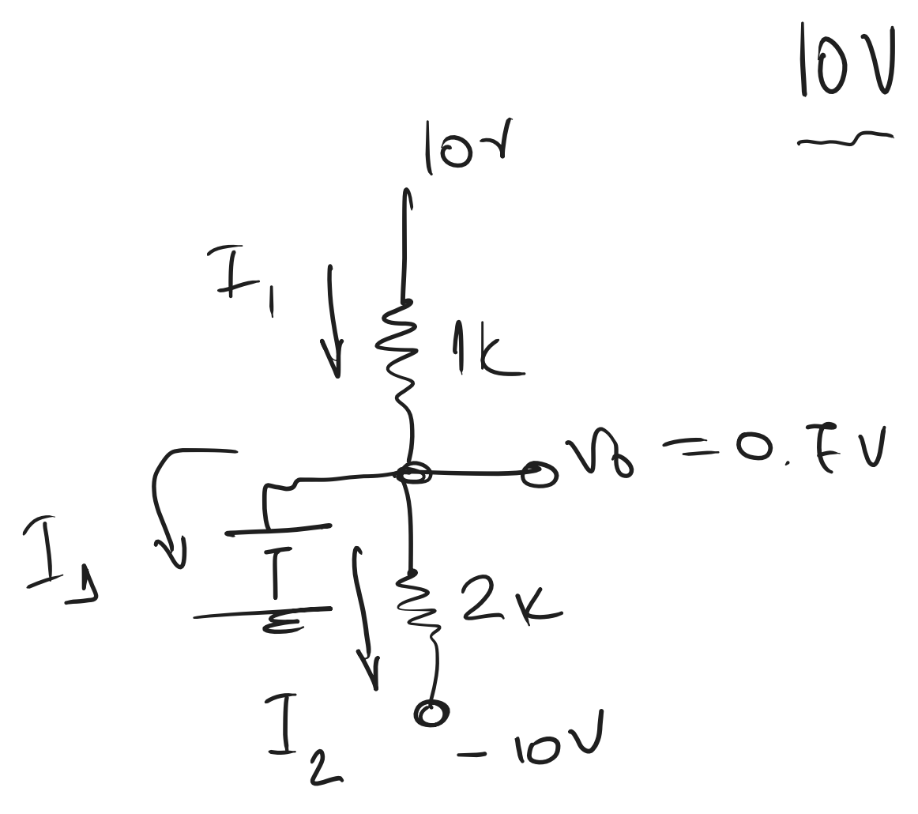
$\boxed{\text{ΘΕΤΩ}}$ ΟΤΙ $V_o < 0V \Rightarrow$ ΤΟΤΕ ΔΙΟΔΟΣ ΑΝΑΣΤΡΟΦΑ ΠΟΛΩΜΕΝΗ. :)

$$I = \frac{10V - (-10V)}{3k\Omega} = \frac{20}{3}\frac{V}{k\Omega} = \underline{6.6mA}$$



$10V - 1k\Omega \times 6.6mA = 10V - 6.6V = 3.4V = V_o$

ΑΤΟΠΟ :(



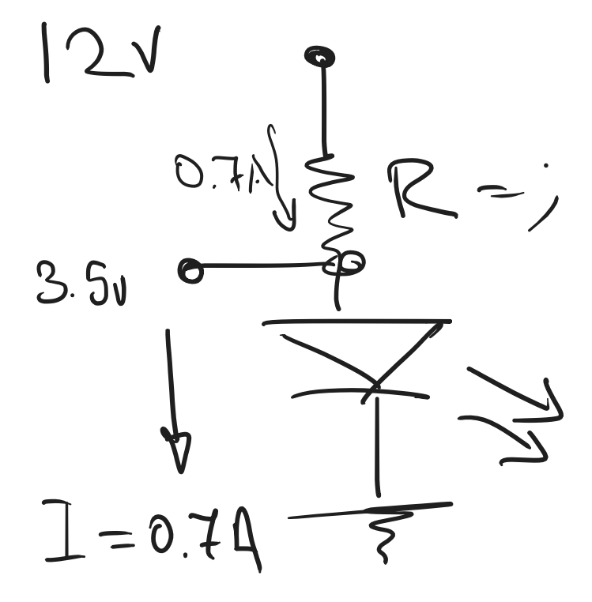
$I_1 = \frac{10V - 0.7V}{1k\Omega} = 9.3mA$

$I_2 = \frac{0.7V - (-10V)}{2k\Omega} = \frac{10.7}{2}\frac{V}{k\Omega} = 5.35mA$

$I_D = I_1 - I_2 = 9.3 - 5.35mA$

$\boxed{I_D = 3.95mA}$

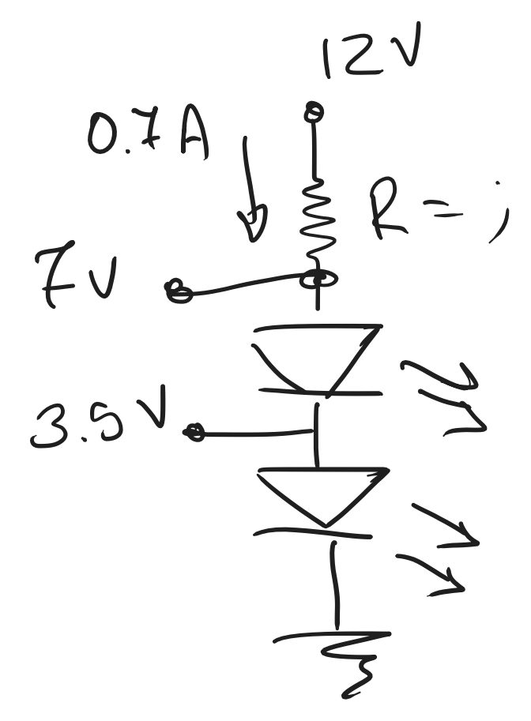
POWER LED.



$R = \frac{12 - 3.5}{0.7}\frac{V}{A} = 12.14\ \Omega$

$P_R = (12 - 3.5) \cdot 0.7 = 5.95W$

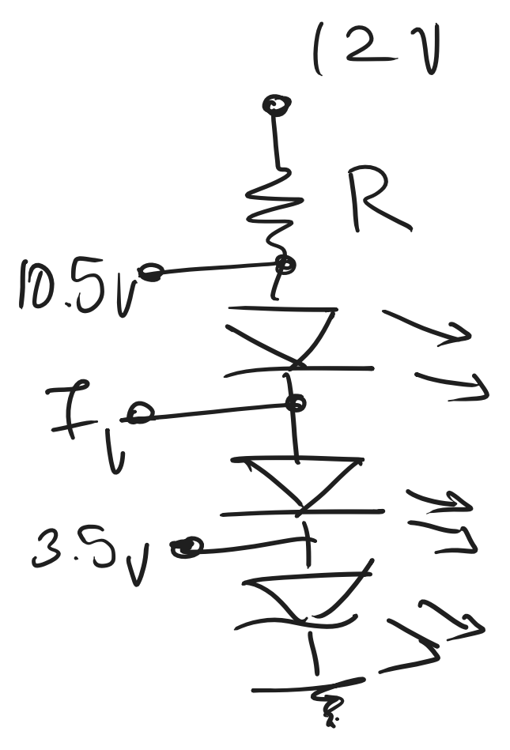
$\underline{\text{ΑΠΟΔΟΣΗ}} = \frac{P_{\text{ΧΡΗΣΙΜΗ}}}{P_{\text{ΕΝΝΟΛΙΚΗ}}} = \frac{3.5V \times \cancel{0.7A}}{12V \times \cancel{0.7A}} = \frac{3.5}{12} = 29\%$



$R = \frac{12 - 7}{0.7}\frac{V}{A} = 5.7\ \Omega$

$P_R = (12 - 7) \times 0.7 = 3.5W$

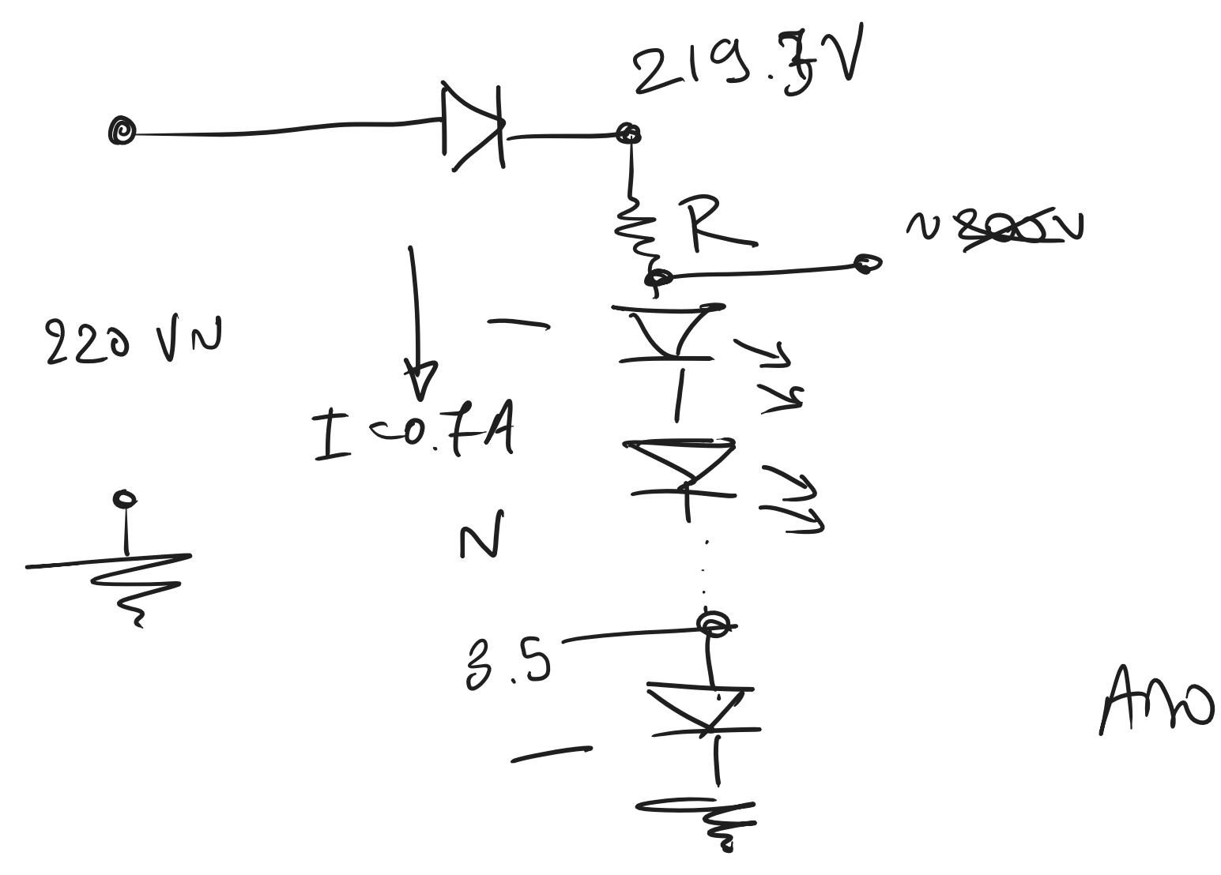
$\underline{\text{ΑΠΟΔΟΣΗ}} = \frac{P_{\text{ΧΡΗΣΙΜΗ}}}{P_{\text{ΕΝΝΟΛΙΚΗ}}} = \frac{7V \times \cancel{0.7A}}{12V \times \cancel{0.7A}} = 58\%$



$R = \frac{12 - 10.5}{0.7} = 2.14\ \Omega$

$P_R = (12 - 10.5) \times 0.7 = \underline{1.5W}$

$\underline{\text{ΑΠΟΔΟΣΗ}} = \frac{P_{\text{ΧΡ}}}{P_{\text{ΕΝ.}}} = \frac{10.5V \times 0.7A}{12V \times 0.7A} = 87.5\%$



$3.5V \times N = 200V \Rightarrow N = \frac{200}{3.5} = 57.14 \simeq 58$

$58 \times 3.5V = 203V$

$R \simeq \frac{220 - 203}{0.7} = 24.28\ \Omega$

$\text{ΑΠΟΔΟΣΗ} = \frac{P_{\text{ΧΡ}}}{P_{\text{ΕΝΝ.}}} = \frac{203V \times \cancel{0.7A}}{220V \times \cancel{0.7A}} = 92.2\%$

ΔΙΟΔΟΙ → ΑΝΟΡΘΩΣΗ ΤΑΣΗΣ