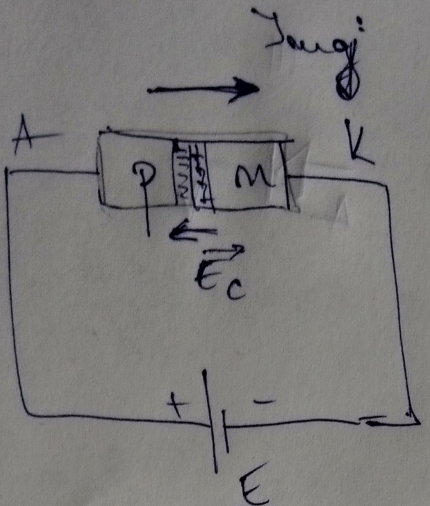
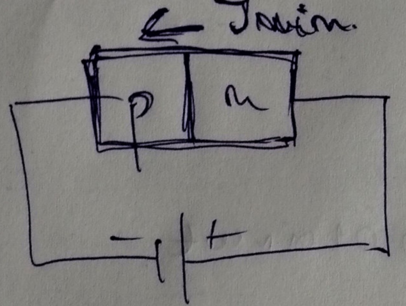
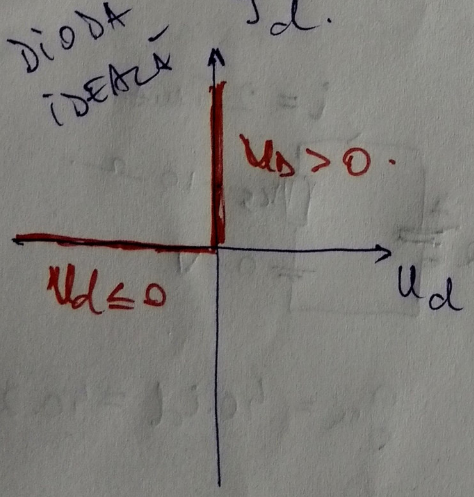
SEMINAR 2 ELECTRONICĂ II

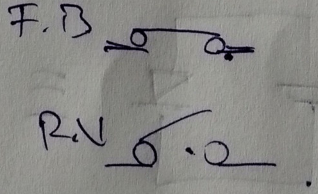


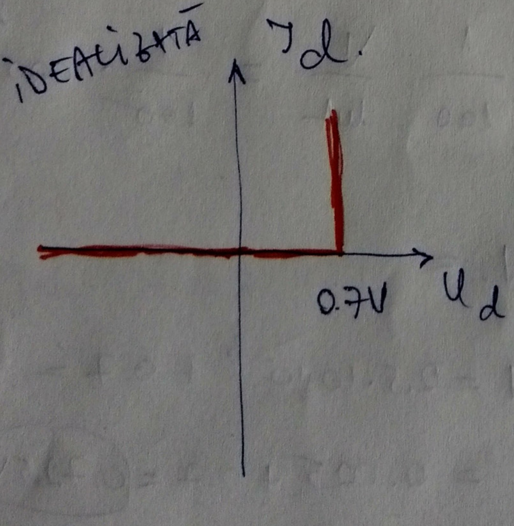
pol. directă
forward bias
F.B.

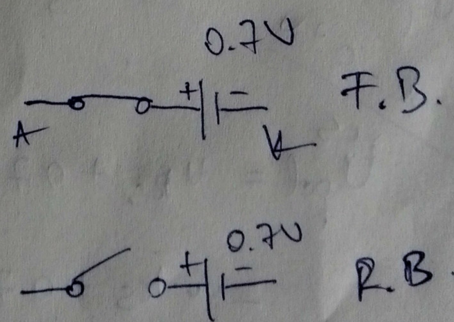


pol. inversă
reverse bias.
(R.B.V.)

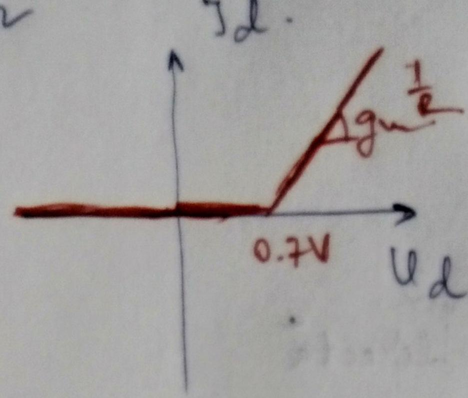


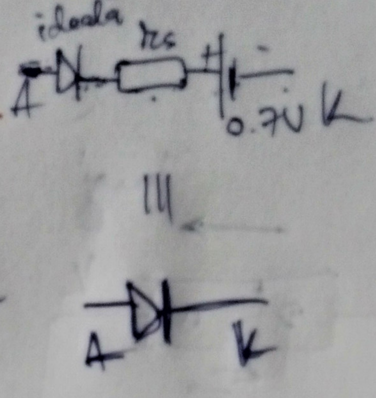






PRACTICAL MODEL





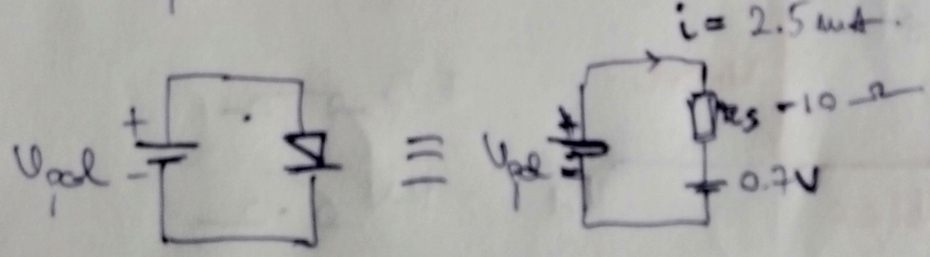
(2) $i_d = 2.5\ mA$

$U_d = 0.7V$

$u(t) = 10 \sin\omega t = 0.01 \sin\omega t$
mV

$U'_{pol} = U_{pol} + u(t)$ ↗ 0.715V ↘ 0.735V

circuit de polarizare



$g_m = 40 \cdot i_d = 40 \cdot 2.5 = 100\ mA/V =$

$U'_{pol} = i' r_s + 0.7V \Rightarrow$

$\Rightarrow i' r_s = U'_{pol} - 0.7V$

$i' = \frac{U'_{pol} - 0.7V}{r_s}$

$\Rightarrow r_s = \frac{1}{100} \frac{V}{mA} = \frac{1}{100} \cdot 1000 \frac{V}{A} = 10\ \Omega$

$U_{pol} = U_{rs} + 0.7V =$

$= i \cdot r_s + 0.7V = 2.5 \cdot 10 \cdot 10^{-3} + 0.7 =$

$= 0.025 + 0.7 = 0.725V.$

~~$i' = \frac{u'_{pol}}{r_S} - 0.07$~~

~~$i' = \frac{u'_{pol}}{10} - 0.07 = \frac{u_{pol}}{10} + \frac{u(t)}{10} - 0.07$~~

$$i' = \frac{u'_{pol}}{r_S} - 0.07 = \frac{u'_{pol}}{10} - 0.07 = \frac{u_{pol}}{10} + \frac{u(t)}{10} - 0.07 =$$

$$= \frac{0.725}{10} - 0.07 + \frac{u(t)}{10} = 0.0725 - 0.07 + \frac{0.01}{10}\sin\omega t =$$

$$= 0.0025 + 0.001\sin\omega t \Rightarrow$$

$$\Rightarrow \boxed{i' = 2.5\,mA + 1\sin\omega t\ mA}$$

$$u_{pol} = i r_S + 0.7V \Rightarrow i r_S = u_{pol} - 0.7$$

$$i = \frac{u_{pol} - 0.7}{r_S} = \frac{u_{pol} - 0.7}{10} =$$

$$= \frac{0.035}{10} = 0.0035$$

↓

3.5 mA

100 mA — 1 V

x — 10 mV (0.01 V)

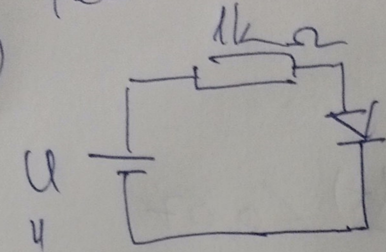
$$x = 0.01 \cdot 100 = 1\,mA$$

$g_m = 100\,mA/V$.

$U = 10V$.

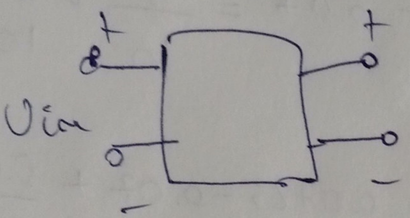
$R = 1k\Omega$

(3.) Temă



I = ?

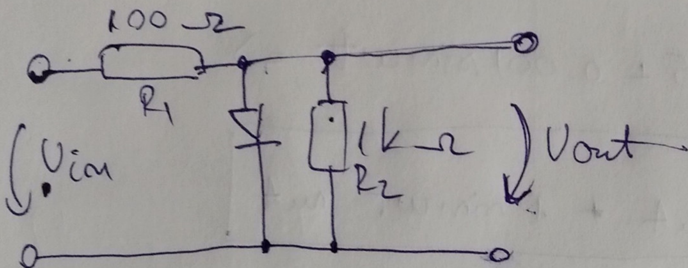
hint: modelul idealizat practic

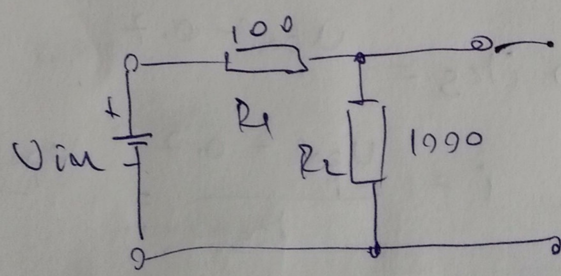


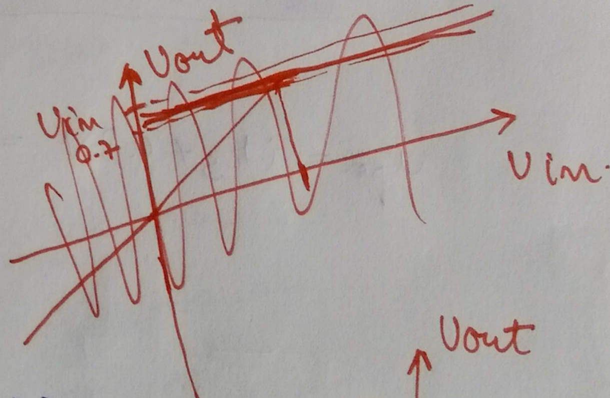
$\frac{U_{out}}{U_{in}} = f(U_{in})$.

Temă 5, (b, c, d)

(4.)

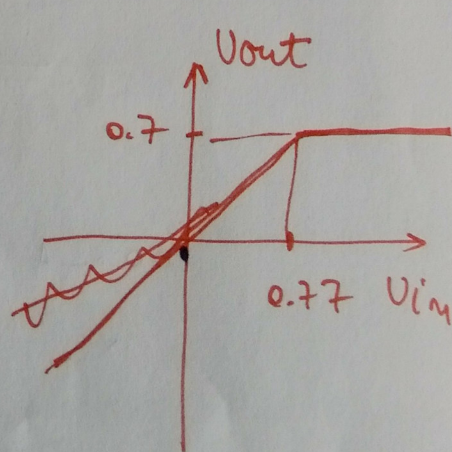




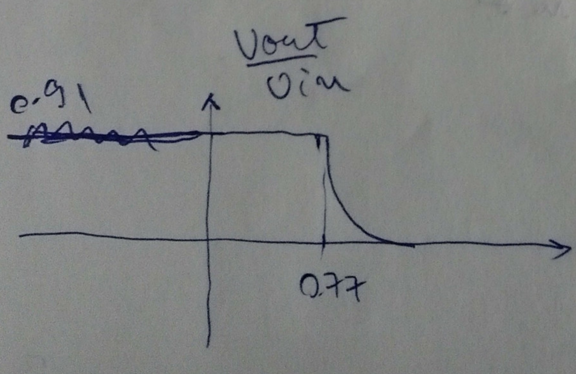


$U_{in} = i \cdot 1100 = i R_1$

$U_{out} = i \cdot 1000 = i \cdot R_2$



$$\frac{U_{out}}{U_{in}} = \frac{i \cdot 1000}{i \cdot 1100} = \frac{10}{11} = 0.91$$



$U_{out} = 0.91 U_{in} > 0.7V$.

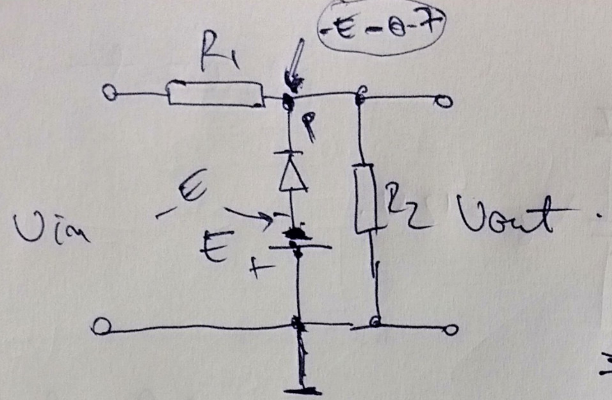
$U_{out} = 0.7V$

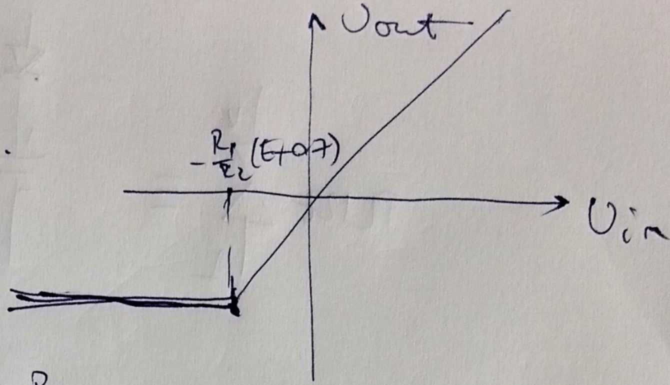
$0.91 U_{in} = 0.7V$

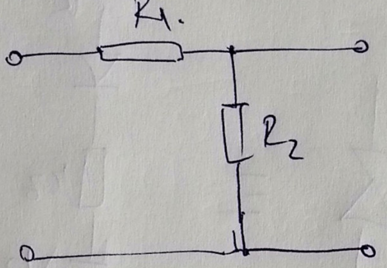
$U_{in} = \frac{0.7}{0.91} = 0.77V$.

− 4 =

1) a)



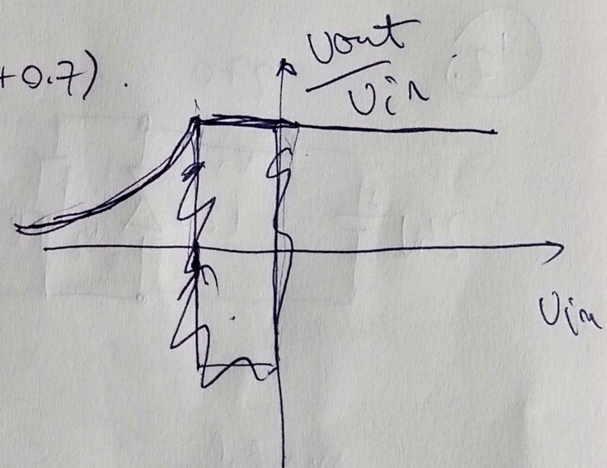




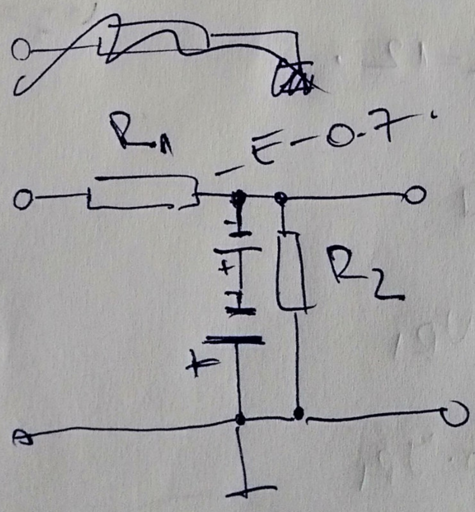
$V_p > 0.7V \equiv$ $\quad V_{out} = \frac{R_2}{R_1} \cdot U_{in}$

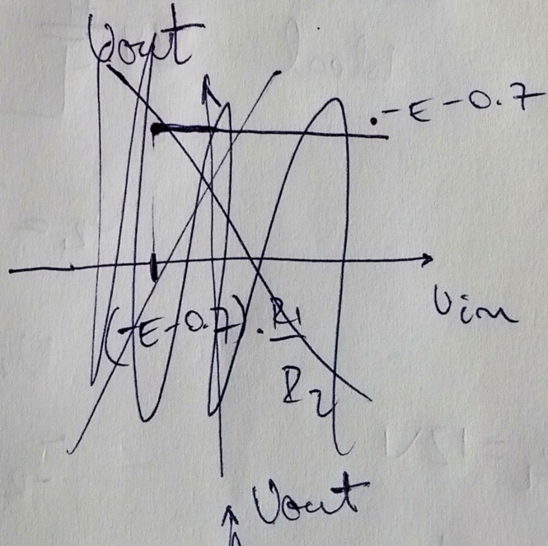
$$V_p = \frac{R_2}{R_1} \cdot U_{in}$$

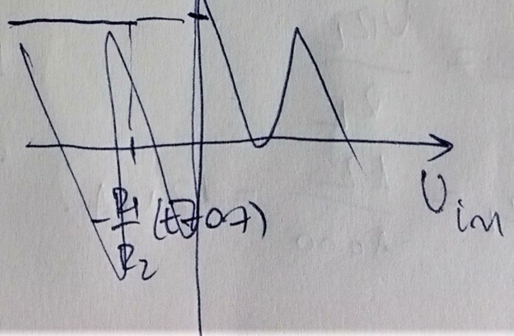
$$U_{in} = \frac{R_1}{R_2} \cdot V_p = -\frac{R_1}{R_2}(E+0.7)$$



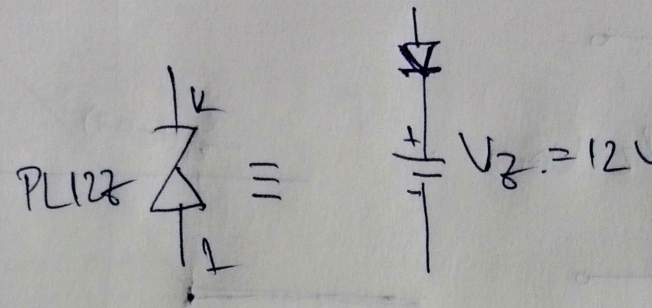
$$U_{in} \geq -\frac{R_1}{R_2}(E+0.7)$$



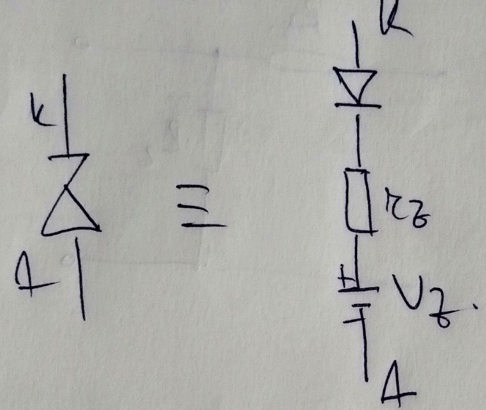




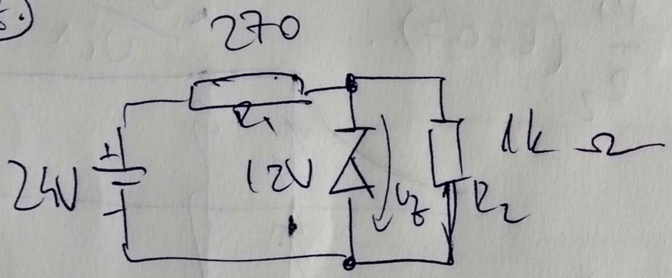
idealizat



model idealizat practic



(1Z.)



$24 = i \cdot 1270$

$u_Z = i \cdot 1000$

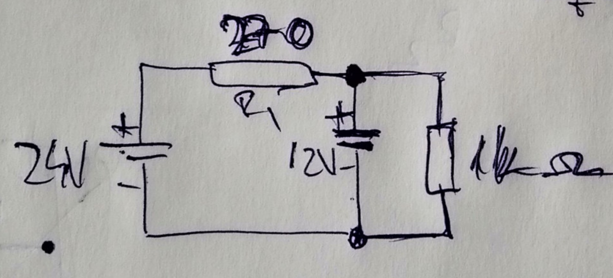
$\frac{U_Z}{24} = \frac{1000}{1270}$

$u_Z = 24 \cdot \frac{1000}{1270} =$

$= 18.898V.$

$> 12V$

model ideal



$U_{R_1} = 24 - 12 = 12.$

$U_{R_1} = 12V$

$U_{R_L} = 12V$

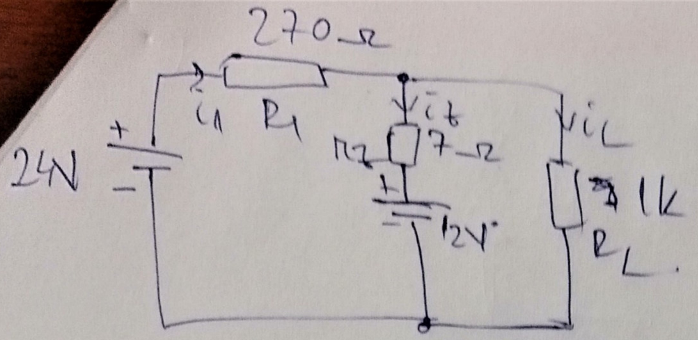
$I_{R_1} \cdot R_1 = U_{R_1}$

$I_{R_L} = \frac{U_{R_L}}{R_L}$

$12 = 270 \cdot I_{R_1}$

$I_{R_L} = \frac{12}{1000} = 12 mA$

$I_{R_1} = \frac{12}{270} = 44.4 mA.$



$$\begin{cases} 24 = u_{R_1} + u_z + 12 \\ 12 + u_z = u_{R_L} \\ i_{R_1} = i_z + i_L \end{cases} \Leftrightarrow \begin{cases} 24 = i_1 \cdot R_1 + i_z r_z + 12 \\ 12 + i_z r_z = i_L \cdot R_L \\ i_1 = i_z + i_L \end{cases}$$

i_1

(Z1 + Z2) Temă

CAB.

$U_z = 16V.$

$i_z = 25mA$

$r_z = 15\Omega$