

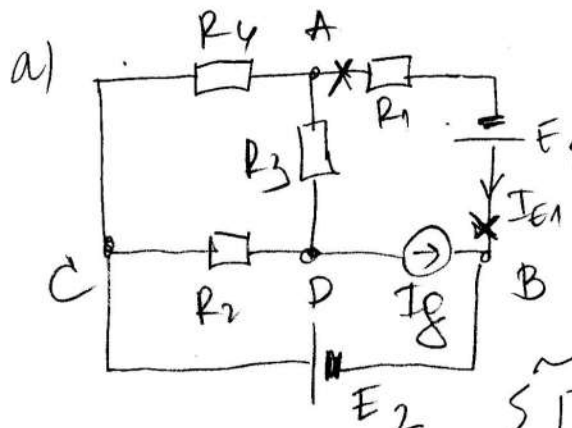
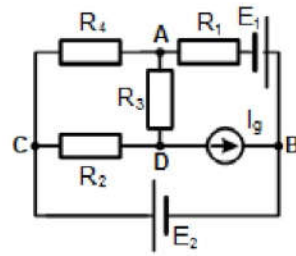
I. U kolu na slici primenom Tevenenove teoreme odrediti

a) snagu naponskog generatora P_{E1} .

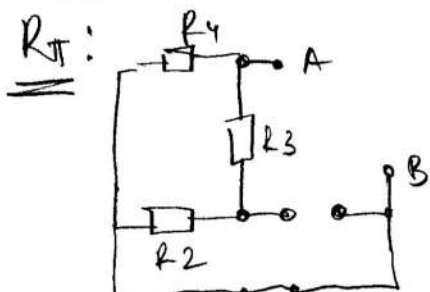
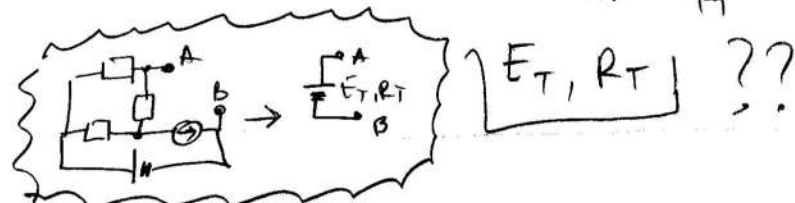
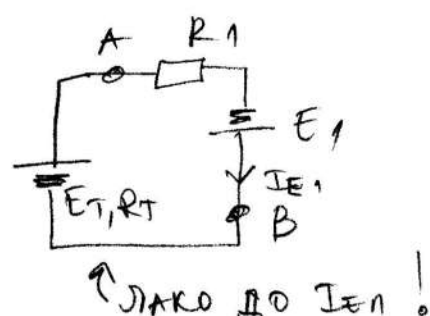
b) snagu otpornika R_3 , P_{R3}

Poznato je: $E_1 = 60V$, $E_2 = 40V$, $I_g = 1A$.

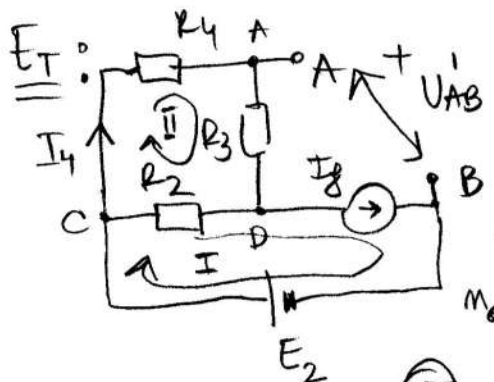
$R_1 = R_2 = R_3 = R_4 = R = 10\Omega$.



$P_{E1} = ?$
 \Downarrow
 $I_{E1} = ?$
 \Rightarrow



$$R_T = R_{AB} = (R_2 + R_3) \parallel R_4 = \frac{2R}{3} = \frac{20}{3} \Omega$$



$E_T = U_{AB}'$ — ОТВОРЕНА БЕЗА!

РЕШУМ КОЛО! БУДО КАКО...

⊗ НОП. МКС

$$n_1 - n_2 + 1 = 2 \Rightarrow 2 \times 2$$

Ⓜ I $I_I = I_g = 1A$

Ⓜ II $-R_2 I_I + (R_2 + R_3 + R_4) I_{II} = 0$

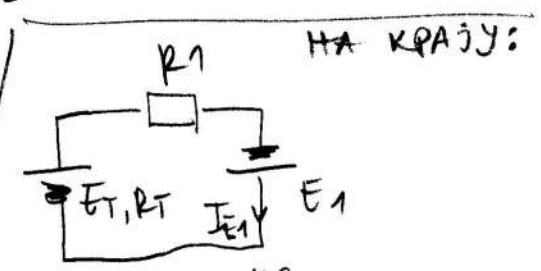
$$I_{II} = \frac{R_2}{R_2 + R_3 + R_4} I_g = \frac{I_g}{3} = \frac{1}{3} A$$

$U_{AB}' = ? \Rightarrow I_{R4} = ?$

$$I_{R4} = I_4 = I_{II} = \frac{1}{3} A$$

$$U_{AB}' = E_2 - R_4 I_4 = 40 - 10 \cdot \frac{1}{3} = \frac{110}{3} V \Rightarrow$$

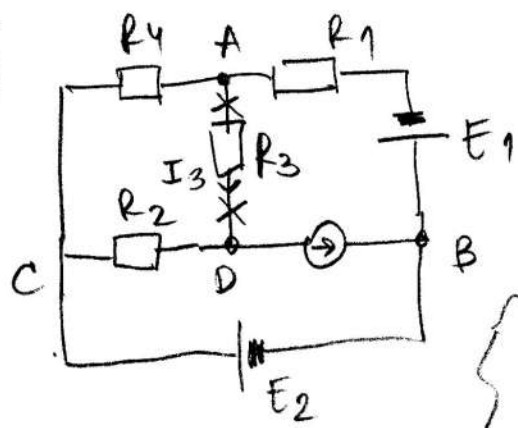
$$E_T = \frac{110}{3} V$$



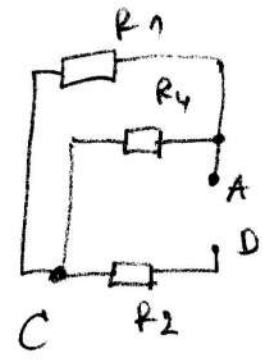
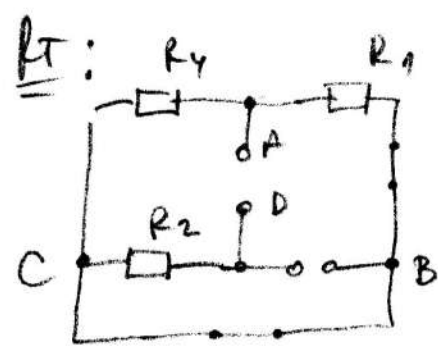
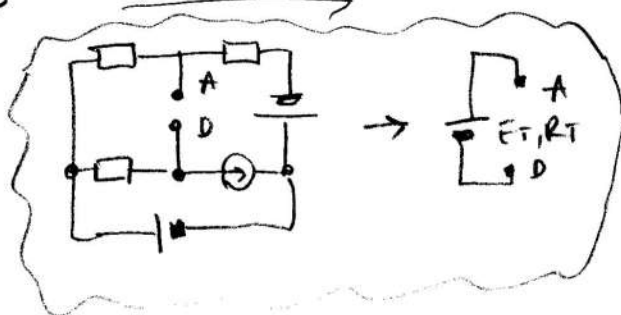
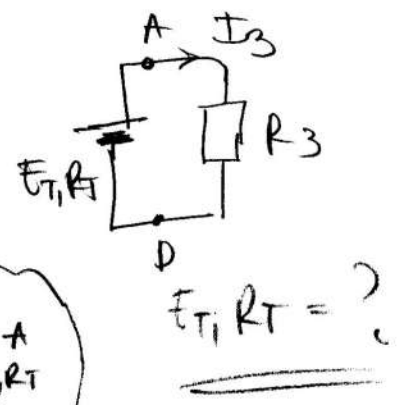
$$I_{E1} = \frac{E_T + E_1}{R_T + R_1} = \frac{\frac{110}{3} + 60}{10 + \frac{20}{3}} = \frac{290}{50} = \frac{29}{5} A$$

$$P_{E1} = E_1 \cdot I_{E1} = 60 \cdot \frac{29}{5} = 348 W$$

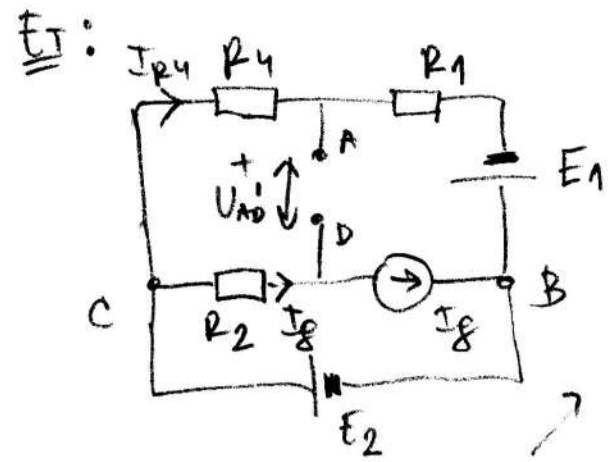
5)



$P_{R3} = ?$
 \Downarrow
 $I_{R3} = ?$



$R_T = R_{AD} = R_2 + R_1 \parallel R_4$
 $R_T = \frac{3R}{2} = 15 \Omega$



MAY: $U_{C-1} = 1$ 1×1
 $\frac{B}{C}$

$B=0 \Rightarrow U_{C0} = E_2$

$U_{AD}' = ? \Rightarrow I_{R4} = ?, I_{R2} = ?$

$I_{R2} = I_g = 1A!$

$E_T = U_{AD}' = ?$

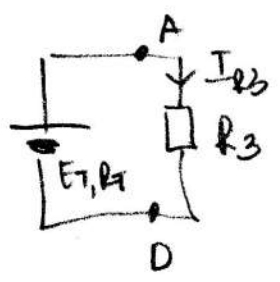
$I_{R4} = ? \rightarrow U_{C0} = -E_1 + (R_1 + R_4) I_{R4}$

$I_{R4} = \frac{U_{C0} + E_1}{R_1 + R_4} = \frac{E_2 + E_1}{R_1 + R_4} = 5A$

$U_{AD}' = R_2 I_g - R_4 I_{R4} = -40V$

$E_T = -40V$

##A KPAJY:



$I_{R3} = \frac{E_T}{R_T + R_3}$

$I_{R3} = \frac{-40}{25} = -1,6A$

$P_{R3} = R_3 I_{R3}^2 = 25,6 W$

2. Za kolo na slici odrediti količinu naelektrisanja Q

kojom je opterećen kondenzator C:

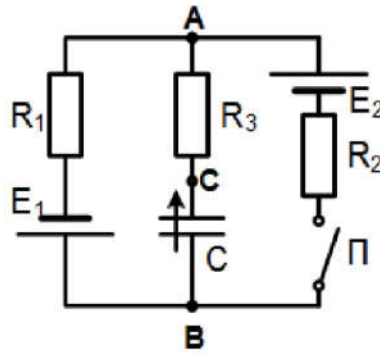
a) ukoliko je prekidač Π zatvoren,

b) ukoliko je prekidač Π otvoren,

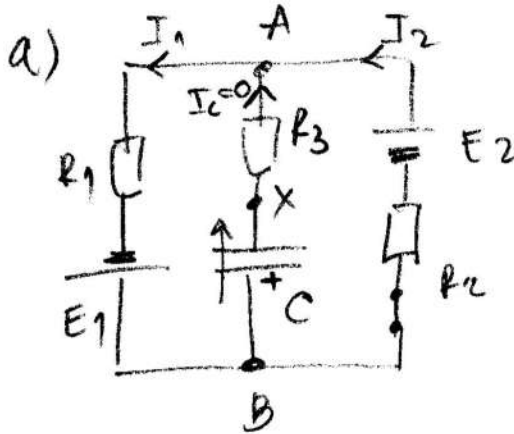
$R_1 = 10\Omega$, $R_2 = 20\Omega$, $R_3 = 30\Omega$, $E_1 = 3V$, $E_2 = 5V$,

$C = 10\mu F$.

* Prekidac je zatvoren i u kolu je uspostavljeno stacionarno stanje. Odrediti količinu naelektrisanja koje ce proteci kroz granu sa kondenzatorom nakon otvaranja prekidača.



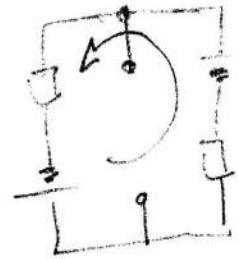
$\frac{C}{\text{---}}$ у коју је $\dot{E}_1 + E_2$ \dot{E}_2 $U_C = \text{const}$
 * у стаціонарному станні (све $I, U = \text{const}$), $\underline{I_C = 0}$



$I_C = 0 \Rightarrow I_1 = I_2$ (ПРОСТА КОНТУРА)

$$I_1 = I_2 = \frac{E_1 + E_2}{R_1 + R_2}$$

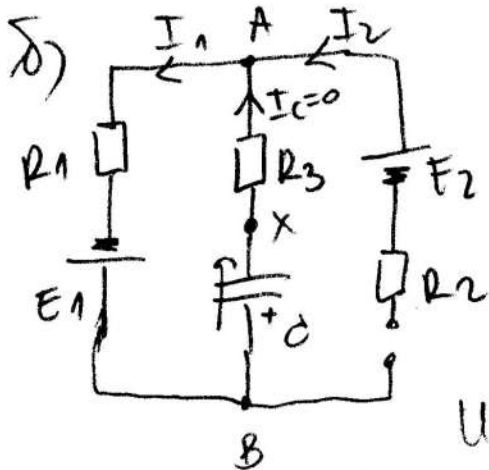
$$I_1 = I_2 = \frac{8}{30} = \frac{4}{15} \text{ A}$$



$$U_C = U_{BX} = -R_3 I_C - E_2 + R_2 I_2$$

$$U_C = -5 + 20 \cdot \frac{4}{15} = \frac{1}{3} \text{ V}$$

$$Q_C = C U_C = \frac{10}{3} \mu C$$



$$I_2 = 0 \text{ (---)}$$

$$I_C = 0 \text{ (--- у коју } I_C)$$

$$\Downarrow$$

$$I_1 = I_C + I_2 = 0!$$

$$U_C = U_{BX} = -R_3 I_C - R_1 I_1 + E_1 = 3 \text{ V}$$

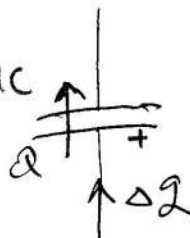
$$Q_C = C U_C = 30 \mu C$$

* 1) --- $Q_{C1} = Q_C(a) = \frac{10}{3} \mu C$

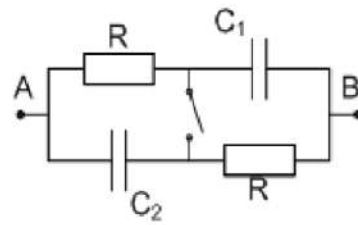
КРАЈЊЕ ПОЧЕТНО ПРОТЕКЛО
 $\downarrow \quad \downarrow \quad \downarrow$
 $Q_{C2} = Q_{C1} + \Delta Q$

2) --- $Q_{C2} = Q_C(b) = 30 \mu C$

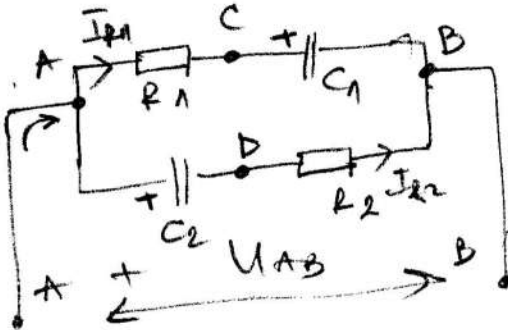
$$\Delta Q = Q_{C2} - Q_{C1} = \frac{80}{3} \mu C$$



3. Na slici je prikazana mreža otpornika i kondenzatora priključena na napon nepromenljive vrednosti $U_{AB} = 20V$. Poznate su kapacitivnosti kondenzatora: $C_1 = 10nF$, $C_2 = 15nF$ i otpornost $R = 20\Omega$. Odrediti količinu naelektrisanja i napon na svakom kondenzatoru:
 a) pri otvorenom prekidaču;
 b) pri zatvorenom prekidaču.



a)



$$R_1 = R_2 = R = 20 \Omega$$

$$C_1 = 10 nF$$

$$C_2 = 15 nF$$

$$I_{C1} = 0 \Rightarrow I_{R1} = 0$$

$$I_{C2} = 0 \Rightarrow I_{R2} = 0$$

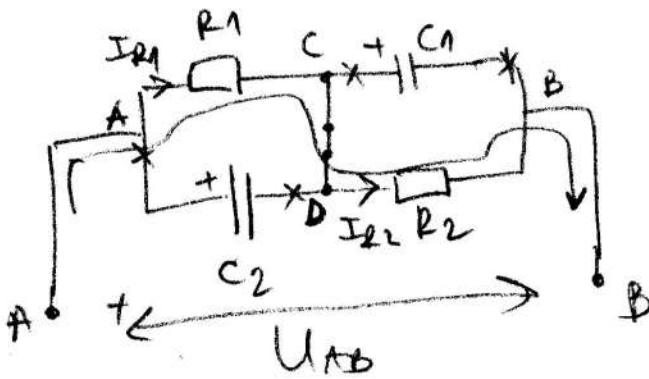
$$U_{C1} = U_{CB} = U_{AB} - R_1 I_{R1} = U_{AB} = 20V$$

$$Q_{C1} = C_1 U_{C1} = 200 nC$$

$$U_{C2} = U_{AD} = -R_2 I_{R2} + U_{AB} = U_{AB} = 20V$$

$$Q_{C2} = C_2 U_{C2} = 300 nC$$

b)



$$I_{R1} = I_{R2} = \frac{U_{AB}}{R_1 + R_2} = \frac{20V}{40\Omega} = 0,5A$$

$$U_{C1} = U_{CB} = U_{DB} = R_2 I_{R2} = 10V$$

$$Q_{C1} = C U_{C1} = 100 nC$$

$$U_{C2} = U_{AD} = U_{AC} = R_1 I_{R1} = 10V$$

$$Q_{C2} = C U_{C2} = 150 nC$$