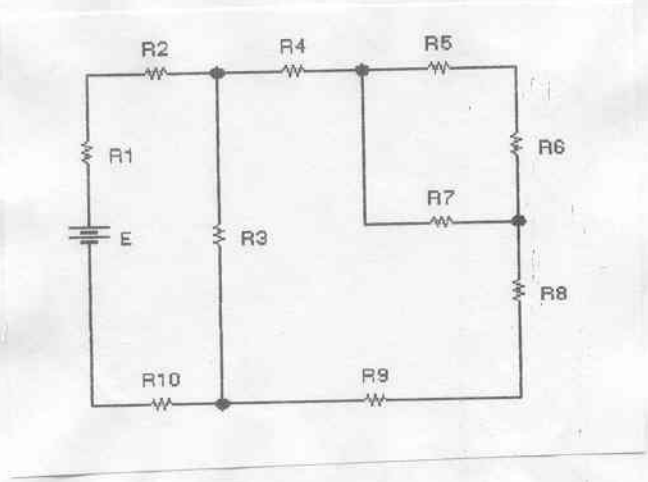
Del circuito di figura calcolare:

9. La resistenza equivalente vista dal generatore.

10. La corrente e la differenza di potenziale di ogni resistenza.

11. La potenza erogata dal generatore.

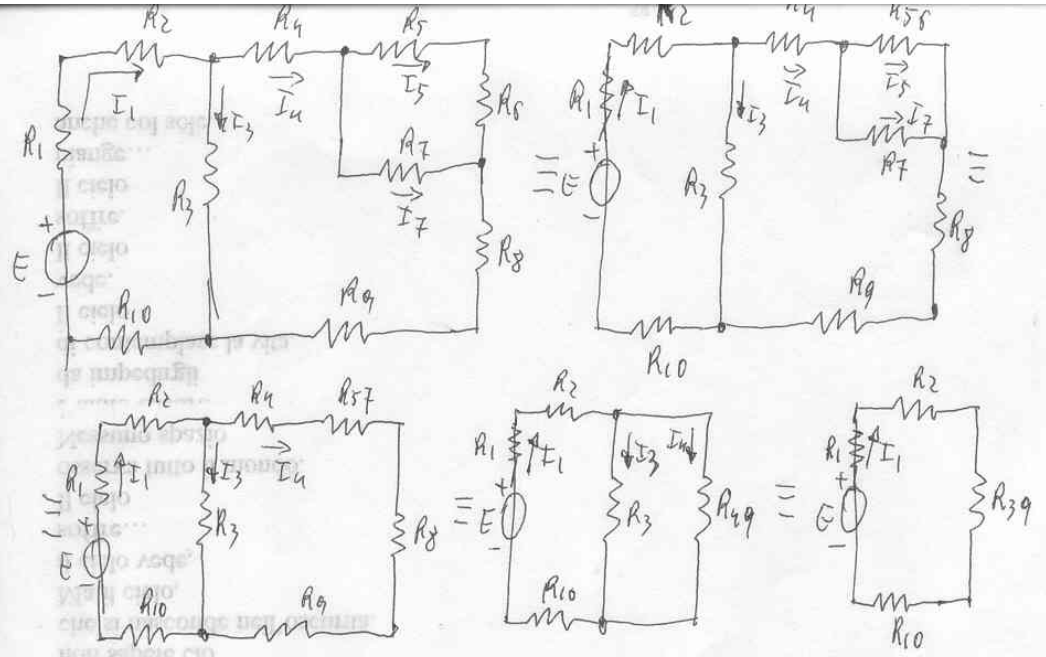
12. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



$E = 100\ V$; $R_1 = 1\ K\Omega$; $R_2 = 4{,}7\ K\Omega$; $R_3 = 3{,}9K\Omega$; $R_4 = 3{,}3\ K\Omega$; $R_5 = 1\ K\Omega$;

$R_6 = 1{,}5\ K\Omega$; $R_7 = 6{,}8\ K\Omega$; $R_8 = 1\ K\Omega$; $R_9 = 4{,}7\ K\Omega$; $R_{10} = 2{,}2\ K\Omega$.

1.1



1.- $R_{56} = R_5 + R_6 = 1\cdot10^3 + 1{,}5\cdot10^3 = 2{,}5\,K\Omega$; $R_{57} = \frac{R_{56}R_7}{R_{56}+R_7} = \frac{2{,}5\cdot10^3\cdot6{,}8\cdot10^3}{2{,}5\cdot10^3+6{,}8\cdot10^3} = 1{,}83\,K\Omega$

$R_{49} = R_4 + R_{57} + R_8 + R_9 = 3{,}3\cdot10^3 + 1{,}83\cdot10^3 + 1\cdot10^3 + 4{,}7\cdot10^3 = 10{,}83\,K\Omega$

$R_{39} = \frac{R_3R_{49}}{R_3+R_{49}} = \frac{3{,}9\cdot10^3\cdot10{,}83\cdot10^3}{3{,}9\cdot10^3+10{,}83\cdot10^3} = 2{,}87\,K\Omega$; $R_{eq} = R_1 + R_2 + R_{39} + R_{10} = 1\cdot10^3 + 4{,}7\cdot10^3 + 2{,}87\cdot10^3 + 2{,}2\cdot10^3 =$
$= 10{,}77\,K\Omega$

2.- $I_1 = \frac{E}{R_{eq}} = \frac{100}{10{,}77\cdot10^3} = 9{,}285\,mA$; $V_1 = R_1I_1 = 1\cdot10^3\cdot9{,}285\cdot10^{-3} = 9{,}285\,V$

$V_2 = R_2I_2 = 4{,}7\cdot10^3\cdot9{,}285\cdot10^{-3} = 43{,}64\,V$; $V_{39} = V_3 = V_{49} = R_{39}I_1 = 2{,}87\cdot10^3\cdot9{,}285\cdot10^{-3} = 26{,}65\,V$

$V_{10} = 2{,}2\cdot10^3\cdot9{,}285\cdot10^{-3} = 20{,}43\,V$; $V_1 + V_2 + V_{39} + V_{10} = 9{,}285 + 43{,}64 + 26{,}65 + 20{,}43 = 100\,V$

$I_3 = \frac{V_3}{R_3} = \frac{25{,}55}{3{,}9\cdot10^3} = 6{,}83\,mA$; $I_4 = \frac{V_{49}}{R_{49}} = \frac{25{,}55}{10{,}83\cdot10^3} = 2{,}46\,mA$

$V_4 = R_4I_4 = 3{,}3\cdot10^3\cdot2{,}46\cdot10^{-3} = 8{,}12\,V$; $V_{57} = V_{56} = V_7 = R_{57}I_4 = 1{,}83\cdot10^3\cdot2{,}46\cdot10^{-3} = 4{,}5\,V$

$V_8 = R_8I_4 = 1\cdot10^3\cdot2{,}46\cdot10^{-3} = 2{,}46\,V$; $V_9 = R_9I_4 = 4{,}7\cdot10^3\cdot2{,}46\cdot10^{-3} = 11{,}56\,V$

$V_4 + V_{57} + V_8 + V_9 = 8{,}12 + 4{,}5 + 2{,}46 + 11{,}56 = 26{,}64\,V$

$I_5 = \frac{V_{56}}{R_{56}} = \frac{4{,}5}{2{,}5\cdot10^3} = 1{,}8\,mA$; $I_7 = \frac{V_7}{R_7} = \frac{4{,}5}{6{,}8\cdot10^3} = 0{,}66\,mA$

$V_5 = R_5I_5 = 1\cdot10^3\cdot1{,}8\cdot10^{-3} = 1{,}8\,V$; $V_6 = R_6I_5 = 1{,}5\cdot10^3\cdot1{,}8\cdot10^{-3} = 2{,}7\,V$

Ejercicio 2.1

$I_1 = 9{,}285\ mA$; $I_3 = 6{,}83\ mA$; $I_4 = 2{,}46\ mA$; $I_5 = 1{,}8\ mA$; $I_7 = 0{,}86\ mA$

$V_1 = 9{,}285\ V$; $V_2 = 43{,}64\ V$; $V_3 = 26{,}65\ V$; $V_4 = 8{,}12\ V$; $V_5 = 1{,}8\ V$; $V_6 = 2{,}7\ V$

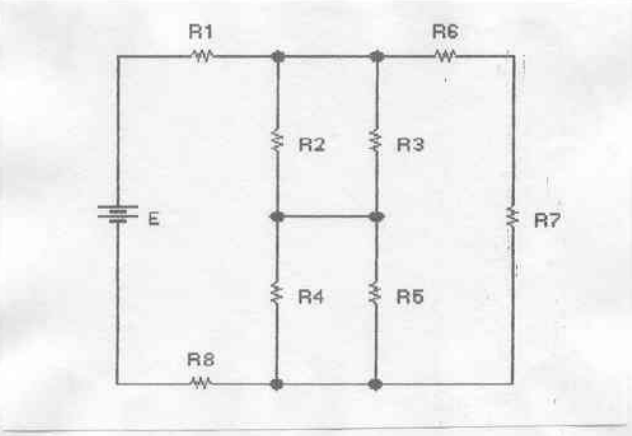
$V_7 = 4{,}5\ V$; $V_8 = 2{,}46\ V$; $V_9 = 11{,}55$; $V_{10} = 20{,}43\ V$

3.- $P = \mathcal{E} \cdot I_1 = 100 \cdot 9{,}285 \cdot 10^{-3} = 0{,}9285\ W$

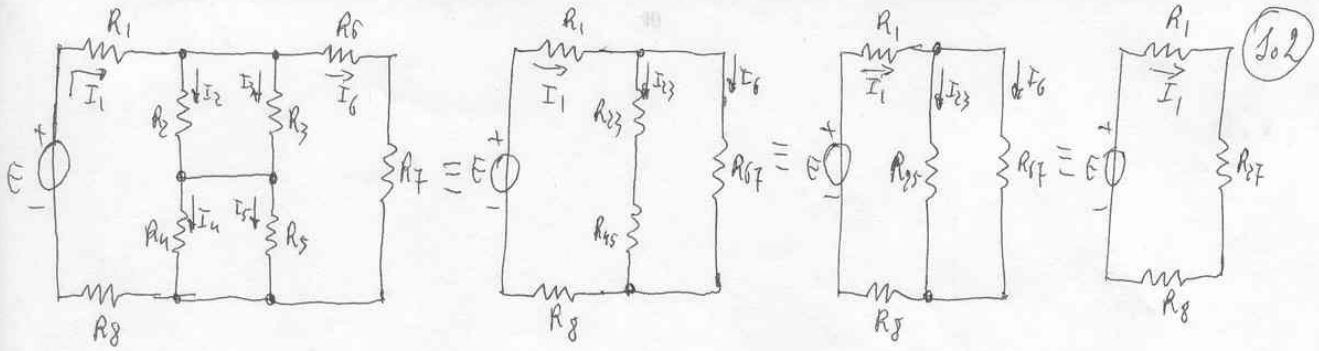
4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 8{,}12 \cdot 2{,}46 \cdot 10^{-3} + 2{,}7 \cdot 1{,}8 \cdot 10^{-3} = 24{,}83\ mW$

Del circuito di figura calcolare:

1. La resistenza equivalente vista dal generatore.
2. La corrente e la differenza di potenziale di ogni resistenza.
3. La potenza erogata dal generatore.
4. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



E = 100 V ; R_1 = 1 KΩ ; R_2 = 4,7 KΩ ; R_3 = 3,9KΩ ; R_4 = 3,3 KΩ ; R_5 = 1 KΩ ; R_6 = 1,5 KΩ ; R_7 = 6,8 KΩ ; R_8 = 1 KΩ.



1.2

1.- $R_{23} = \frac{R_2 R_3}{R_2 + R_3} = \frac{4{,}7\cdot10^3 \cdot 3{,}9\cdot10^3}{4{,}7\cdot10^3 + 3{,}9\cdot10^3} = 2{,}13\,K\Omega$; $R_{45} = \frac{R_4 R_5}{R_4 + R_5} = \frac{3{,}3\cdot10^3 \cdot 1\cdot10^3}{3{,}3\cdot10^3 + 1\cdot10^3} = 0{,}77\,K\Omega$

$R_{67} = R_6 + R_7 = 1{,}5\cdot10^3 + 6{,}8\cdot10^3 = 8{,}3\,K\Omega$; $R_{25} = R_{23} + R_{45} = 2{,}13\cdot10^3 + 0{,}77\cdot10^3 = 2{,}9\,K\Omega$

$R_{27} = \frac{R_{25} R_{67}}{R_{25} + R_{67}} = \frac{2{,}9\cdot10^3 \cdot 8{,}3\cdot10^3}{2{,}9\cdot10^3 + 8{,}3\cdot10^3} = 2{,}15\,K\Omega$; $R_{eq} = R_1 + R_{27} + R_8 = 1\cdot10^3 + 2{,}15\cdot10^3 + 1\cdot10^3 = 4{,}15\,K\Omega$

2.- $I_1 = \frac{E}{R_{eq}} = \frac{100}{4{,}15\cdot10^3} = 24{,}1\,mA$; $V_1 = R_1 I_1 = 1\cdot10^3 \cdot 24{,}1\cdot10^{-3} = 24{,}1\,V$; $V_8 = R_8 I_1 = 1\cdot10^3 \cdot 24{,}1\cdot10^{-3} = 24{,}1\,V$

$V_{27} = V_{25} = V_{67} = R_{27} I_1 = 2{,}15\cdot10^3 \cdot 24{,}1\cdot10^{-3} = 51{,}81\,V$; $V_1 + V_{27} + V_8 = 24{,}1 + 51{,}81 + 24{,}1 = 100\,V$

$I_{23} = \frac{V_{25}}{R_{25}} = \frac{51{,}81}{2{,}9\cdot10^3} = 17{,}86\,mA$; $I_6 = \frac{V_{67}}{R_{67}} = \frac{51{,}81}{8{,}3\cdot10^3} = 6{,}24\,mA$

$V_{23} = V_2 = V_3 = R_{23} I_{23} = 2{,}13\cdot10^3 \cdot 17{,}86\cdot10^{-3} = 38{,}04\,V$; $V_{45} = V_4 = V_5 = R_{45} I_{23} = 0{,}77\cdot10^3 \cdot 17{,}86\cdot10^{-3} = 13{,}76\,V$

$I_2 = \frac{V_2}{R_2} = \frac{38{,}04}{4{,}7\cdot10^3} = 8{,}09\,mA$; $I_3 = \frac{V_3}{R_3} = \frac{38{,}04}{3{,}9\cdot10^3} = 9{,}75\,mA$

$I_4 = \frac{V_4}{R_4} = \frac{13{,}76}{3{,}3\cdot10^3} = 4{,}17\,mA$; $I_5 = \frac{V_5}{R_5} = \frac{13{,}76}{1\cdot10^3} = 13{,}76\,mA$; $V_6 = R_6 I_6 = 1{,}5\cdot10^3 \cdot 6{,}24\cdot10^{-3} = 9{,}36\,V$

$V_7 = R_7 I_7 = 6{,}8\cdot10^3 \cdot 6{,}24\cdot10^{-3} = 42{,}43\,V$

Resumiendo

$I_1 = 24{,}1\,mA$; $I_2 = 8{,}09\,mA$; $I_3 = 9{,}75\,mA$; $I_4 = 4{,}17\,mA$; $I_5 = 13{,}76\,mA$; $I_6 = 6{,}24\,mA$

$V_1 = 24{,}1\,V$; $V_2 = V_3 = 38{,}04\,V$; $V_4 = V_5 = 13{,}76\,V$; $V_6 = 9{,}36\,V$; $V_7 = 43{,}43\,V$; $V_8 = 24{,}1\,V$

3.- $P = E I_1 = 100 \cdot 24{,}1\cdot10^{-3} = 2{,}41\,W$

4.- $P_{45} = P_4 + P_5 = V_4 I_4 + V_5 I_5 = 13{,}76 \cdot 4{,}17\cdot10^{-3} + 9{,}36 \cdot 6{,}24\cdot10^{-3} = 115{,}78\,mW$

Del circuito di figura calcolare:

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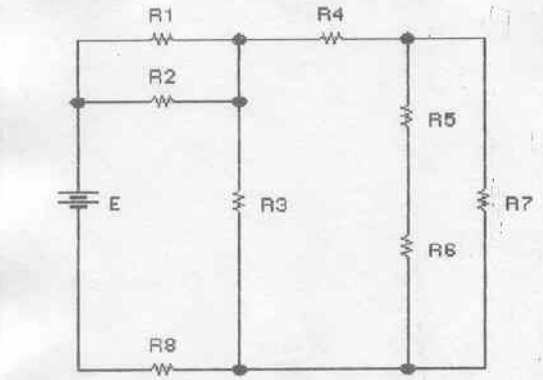
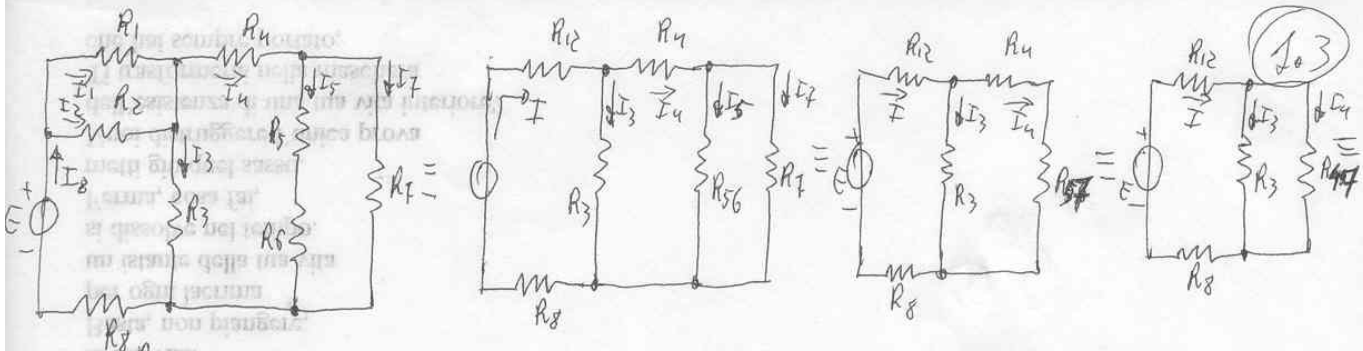
2. La corrente e la differenza di potenziale di ogni resistenza.
3. La potenza erogata dal generatore.
4. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



$E = 100\ V$; $R_1 = 1\ K\Omega$; $R_2 = 4{,}7\ K\Omega$; $R_3 = 3{,}9K\Omega$; $R_4 = 3{,}3\ K\Omega$; $R_5 = 1\ K\Omega$; $R_6 = 1{,}5\ K\Omega$; $R_7 = 6{,}8\ K\Omega$; $R_8 = 1\ K\Omega$.



1_0 – $R_{12} = \frac{R_1 R_2}{R_1 + R_2} = \frac{1 \cdot 10^3 \cdot 4{,}7 \cdot 10^3}{1 \cdot 10^3 + 4{,}7 \cdot 10^3} = 0{,}82\,K\Omega$; $R_{56} = R_5 + R_6 = 1 \cdot 10^3 + 1{,}5 \cdot 10^3 = 2{,}5\,K\Omega$

$R_{57} = \frac{R_{56} R_7}{R_{56} + R_7} = \frac{2{,}5 \cdot 10^3 \cdot 6{,}8 \cdot 10^3}{2{,}5 \cdot 10^3 + 6{,}8 \cdot 10^3} = 1{,}83\,K\Omega$; $R_{47} = R_4 + R_{57} = 3{,}3 \cdot 10^3 + 1{,}83 \cdot 10^3 = 5{,}13\,K\Omega$

$R_{37} = \frac{R_3 \cdot R_{47}}{R_3 + R_{47}} = \frac{3{,}9 \cdot 10^3 \cdot 5{,}13 \cdot 10^3}{3{,}9 \cdot 10^3 + 5{,}13 \cdot 10^3} = 2{,}21\,K\Omega$; $R_{eq} = R_{12} + R_{37} + R_8 = 0{,}82 \cdot 10^3 + 2{,}21 \cdot 10^3 + 1 \cdot 10^3 = 4{,}03\,K\Omega$

– $I_8 = \frac{E}{R_{eq}} = \frac{100}{4{,}03 \cdot 10^3} = 24{,}81\,mA$; $V_{12} = V_1 = V_2 = R_{12} I_8 = 0{,}82 \cdot 10^3 \cdot 24{,}81 \cdot 10^{-3} = 20{,}35\,V$;

$V_{37} = V_3 = V_{47} = R_{37} I_8 = 2{,}21 \cdot 10^3 \cdot 24{,}81 \cdot 10^{-3} = 54{,}83\,V$; $V_8 = R_8 I_8 = 1 \cdot 10^3 \cdot 24{,}81 \cdot 10^{-3} = 24{,}81\,V$

$V_{12} + V_{37} + V_8 = 20{,}35 + 54{,}83 + 24{,}81 = 99{,}99\,V$; $I_3 = \frac{V_3}{R_3} = \frac{54{,}83}{3{,}9 \cdot 10^3} = 14{,}06\,mA$;

$I_4 = \frac{V_{47}}{R_{47}} = \frac{54{,}83}{5{,}13 \cdot 10^3} = 10{,}69\,mA$; $V_4 = R_4 I_4 = 3{,}3 \cdot 10^3 \cdot 10{,}69 \cdot 10^{-3} = 35{,}28\,V$;

$V_{57} = V_{56} = V_7 = R_{57} I_4 = 1{,}83 \cdot 10^3 \cdot 10{,}69 \cdot 10^{-3} = 19{,}58\,V$; $I_5 = \frac{V_{56}}{R_{56}} = \frac{19{,}56}{2{,}5 \cdot 10^3} = 7{,}82\,mA$

$I_7 = \frac{V_7}{R_7} = \frac{19{,}56}{6{,}8 \cdot 10^3} = 2{,}88\,mA$; $I_1 = \frac{V_1}{R_1} = \frac{20{,}35}{1 \cdot 10^3} = 20{,}35\,mA$; $I_2 = \frac{V_2}{R_2} = \frac{20{,}35}{4{,}7 \cdot 10^3} = 4{,}33\,mA$

$V_5 = R_5 I_5 = 1 \cdot 10^3 \cdot 7{,}82 \cdot 10^{-3} = 7{,}82\,V$; $V_6 = R_6 I_5 = 1{,}5 \cdot 10^3 \cdot 7{,}82 \cdot 10^{-3} = 11{,}73\,V$ –

Відповідь

$I_1 = 20{,}35\,mA$; $I_2 = 4{,}33\,mA$; $I_3 = 14{,}06\,mA$; $I_4 = 10{,}69\,mA$; $I_5 = 7{,}82\,mA$

$I_7 = 2{,}88\,mA$; $I_8 = 24{,}81\,mA$; $V_1 = V_2 = 20{,}35\,V$; $V_3 = 54{,}83\,V$; $V_4 = 35{,}28\,V$; $V_5 = 7{,}82\,V$

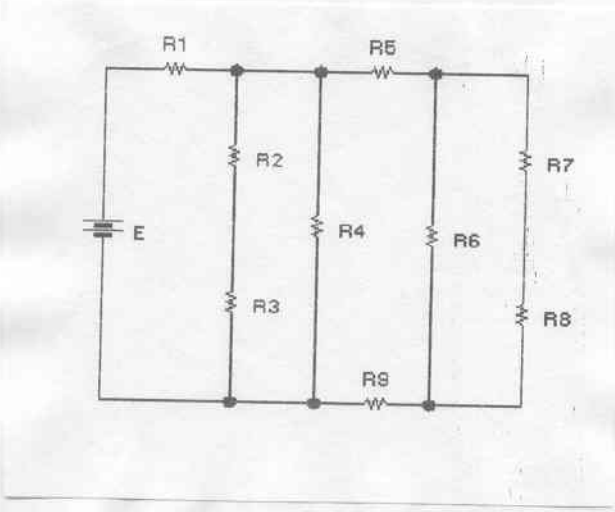
$V_6 = 11{,}73\,V$; $V_7 = 19{,}56\,V$; $V_8 = 24{,}81\,V$

3₀ – $P = E I_8 = 100 \cdot 24{,}81 \cdot 10^{-3} = 2{,}481\,W$

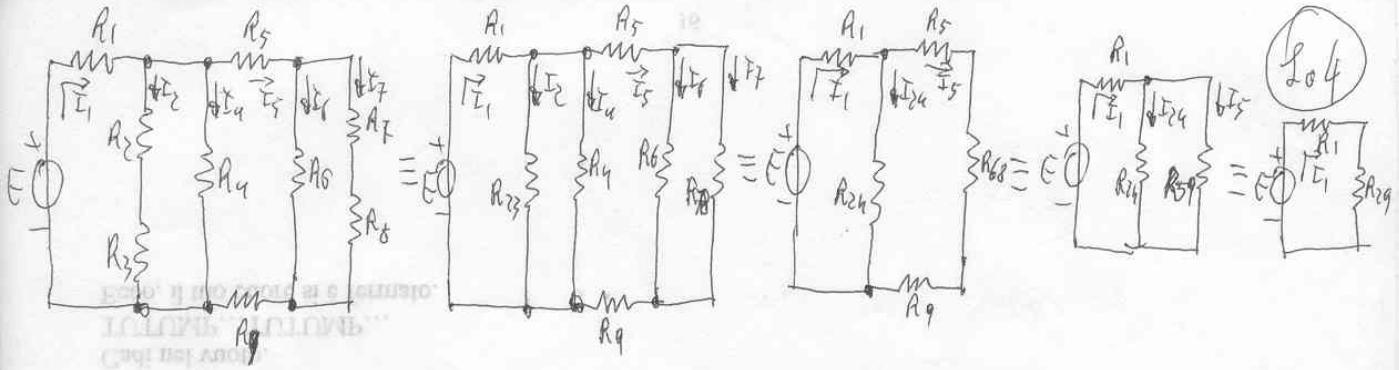
4₀ – $P_{45} = P_4 + P_6 = V_4 I_4 + V_6 I_5 = 35{,}88 \cdot 10{,}69 \cdot 10^{-3} + 11{,}73 \cdot 7{,}82 \cdot 10^{-3} = 0{,}475\,W$

Del circuito di figura calcolare:

5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



E = 100 V ; R_1 = 1 KΩ ; R_2 = 4,7 KΩ ; R_3 = 3,9KΩ ; R_4 = 3,3 KΩ ; R_5 = 1 KΩ ; R_6 = 1,5 KΩ ; R_7 = 6,8 KΩ ; R_8 = 1 KΩ ; R_9 = 4,7 KΩ.



1.- $R_{23} = R_2 + R_3 = 4{,}7\cdot10^3 + 3{,}9\cdot10^3 = 8{,}6\ k\Omega$; $R_{78} = R_7 + R_8 = 6{,}8\cdot10^3 + 1\cdot10^3 = 7{,}8\ k\Omega$

$R_{24} = \frac{R_{23}R_4}{R_{23}+R_4} = \frac{8{,}6\cdot10^3\cdot3{,}3\cdot10^3}{8{,}6\cdot10^3+3{,}3\cdot10^3} = 2{,}38\ k\Omega$; $R_{68} = \frac{R_6R_{78}}{R_6+R_{78}} = \frac{15\cdot10^3\cdot7{,}8\cdot10^3}{15\cdot10^3+7{,}8\cdot10^3} = 1{,}26\ k\Omega$

$R_{59} = R_5 + R_{68} + R_9 = 1\cdot10^3 + 1{,}26\cdot10^3 + 4{,}7\cdot10^3 = 6{,}96\ k\Omega$; $R_{29} = \frac{R_{24}R_{59}}{R_{24}+R_{59}} = \frac{2{,}38\cdot10^3\cdot6{,}96\cdot10^3}{2{,}38\cdot10^3+6{,}96\cdot10^3} = 1{,}77\ k\Omega$

$R_{eq} = R_1 + R_{29} = 1\cdot10^3 + 1{,}77\cdot10^3 = 2{,}77\ k\Omega$

2.- $I_1 = \frac{E}{R_{eq}} = \frac{100}{2{,}77\cdot10^3} = 36{,}1\ mA$; $V_1 = R_1I_1 = 1\cdot10^3\cdot36{,}1\cdot10^{-3} = 36{,}1\ V$; $V_{29} = V_{24} = V_{23} = V_4 = V_{59} =$

$= R_{29}I_1 = 1{,}77\cdot10^3\cdot36{,}1\cdot10^{-3} = 63{,}9\ V$

$I_{24} = \frac{V_{24}}{R_{24}} = \frac{63{,}9}{2{,}38\cdot10^3} = 26{,}85\ mA$; $I_5 = \frac{V_{59}}{R_{59}} = \frac{63{,}9}{6{,}96\cdot10^3} = 9{,}18\ mA$

$V_5 = R_5I_5 = 1\cdot10^3\cdot9{,}18\cdot10^{-3} = 9{,}18\ V$; $V_{68} = V_6 = V_{78} = R_{68}I_5 = 1{,}26\cdot10^3\cdot9{,}18\cdot10^{-3} = 11{,}57\ V$

$V_9 = R_9I_5 = 4{,}7\cdot10^3\cdot9{,}18\cdot10^{-3} = 43{,}15\ V$; $I_2 = \frac{V_{23}}{R_{23}} = \frac{63{,}9}{8{,}6\cdot10^3} = 7{,}43\ mA$

$I_4 = \frac{V_4}{R_4} = \frac{63{,}9}{3{,}3\cdot10^3} = 19{,}36\ mA$; $I_6 = \frac{V_6}{R_6} = \frac{11{,}57}{1{,}5\cdot10^3} = 7{,}71\ mA$; $I_7 = \frac{V_{78}}{R_{78}} = \frac{11{,}57}{7{,}8\cdot10^3} = 1{,}48\ mA$

$V_2 = R_2I_2 = 4{,}7\cdot10^3\cdot7{,}43\cdot10^{-3} = 34{,}92\ V$; $V_3 = R_3I_2 = 3{,}9\cdot10^3\cdot7{,}43\cdot10^{-3} = 28{,}98\ V$

$V_7 = R_7I_7 = 6{,}8\cdot10^3\cdot1{,}48\cdot10^{-3} = 10{,}06\ V$; $V_8 = R_8I_7 = 1\cdot10^3\cdot1{,}48\cdot10^{-3} = 1{,}48\ V$

Resumiendo

$I_1 = 36{,}1\ mA$; $I_2 = 7{,}43\ mA$; $I_4 = 19{,}36\ mA$; $I_5 = 9{,}18\ mA$; $I_6 = 7{,}71\ mA$; $I_7 = 1{,}48\ mA$

$V_1 = 36{,}1\ V$; $V_2 = 34{,}92\ V$; $V_3 = 28{,}98\ V$; $V_4 = 63{,}9\ V$; $V_5 = 9{,}18\ V$; $V_6 = 11{,}57\ V$; $V_7 = 10{,}06\ V$

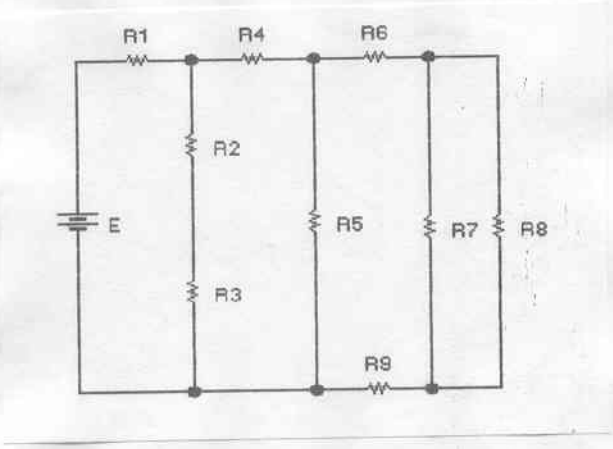
$V_8 = 1{,}48\ V$; $V_9 = 43{,}15\ V$

3.- $P = E\cdot I_1 = 100\cdot36{,}1\cdot10^{-3} = 3{,}61\ W$

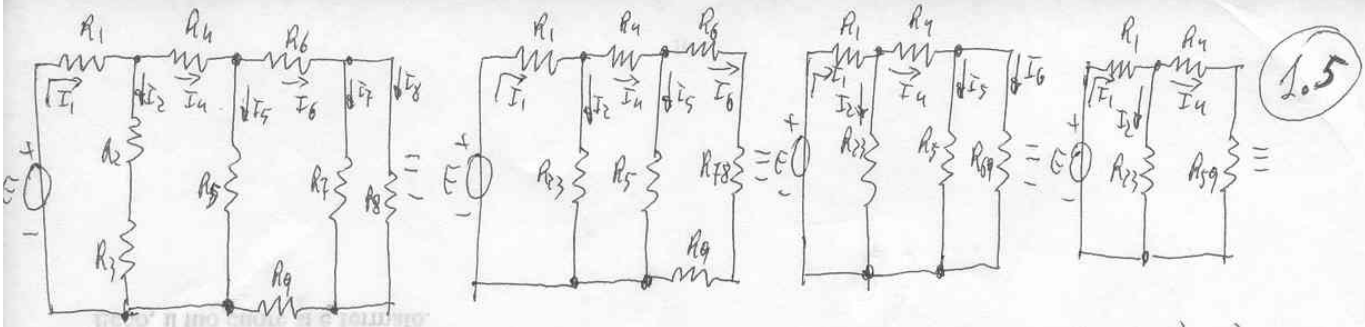
4.- $P_{46} = P_4 + P_6 = V_4I_4 + V_6I_6 = 63{,}9\cdot19{,}36\cdot10^{-3} + 11{,}57\cdot7{,}71\cdot10^{-3} = 1{,}326\ W$

Del circuito di figura calcolare:

5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



E = 100 V ; R_1 = 1 KΩ ; R_2 = 4,7 KΩ ; R_3 = 3,9KΩ ; R_4 = 3,3 KΩ ; R_5 = 1 KΩ ; R_6 = 1,5 KΩ ; R_7 = 6,8 KΩ ; R_8 = 1 KΩ ; R_9 = 4,7 KΩ.



1.5

1.- $R_{23} = R_2 + R_3 = 4{,}7\cdot10^3 + 3{,}9\cdot10^3 = 8{,}6\,K\Omega$; $R_{78} = \frac{R_7 R_8}{R_7+R_8} = \frac{6{,}8\cdot10^3\cdot1\cdot10^3}{6{,}8\cdot10^3+1\cdot10^3} = 0{,}87\,K\Omega$

$R_{69} = R_6 + R_{78} + R_9 = 1{,}5\cdot10^3 + 0{,}87\cdot10^3 + 4{,}7\cdot10^3 = 7{,}07\,K\Omega$

$R_{59} = \frac{R_5 R_{69}}{R_5+R_{69}} = \frac{1\cdot10^3\cdot7{,}07\cdot10^3}{1\cdot10^3+7{,}07\cdot10^3} = 0{,}88\,K\Omega$; $R_{49} = R_4 + R_{59} = 3{,}3\cdot10^3 + 0{,}88\cdot10^3 = 4{,}18\,K\Omega$

$R_{29} = \frac{R_{23} R_{49}}{R_{23}+R_{49}} = \frac{8{,}6\cdot10^3\cdot4{,}18\cdot10^3}{8{,}6\cdot10^3+4{,}18\cdot10^3} = 2{,}81\,K\Omega$; $R_{eq} = R_1 + R_{29} = 1\cdot10^3 + 2{,}81\cdot10^3 = 3{,}81\,K\Omega$

2.- $I_1 = \frac{\mathcal{E}}{R_{eq}} = \frac{100}{3{,}81\cdot10^3} = 26{,}25\,mA$; $V_1 = R_1 I_1 = 1\cdot10^3\cdot26{,}25\cdot10^{-3} = 26{,}25\,V$

$V_{29} = V_{23} = V_{49} = R_{29} I_1 = 2{,}81\cdot10^3\cdot26{,}25\cdot10^{-3} = 73{,}76\,V$; $I_2 = \frac{V_{23}}{R_{23}} = \frac{73{,}76}{8{,}6\cdot10^3} = 8{,}57\,mA$;

$I_4 = \frac{V_{49}}{R_{49}} = \frac{73{,}76}{4{,}18\cdot10^3} = 17{,}65\,mA$; $V_4 = R_4 I_4 = 3{,}3\cdot10^3\cdot17{,}65\cdot10^{-3} = 58{,}24\,V$; $V_{59} = V_5 = V_{69} = R_{59} I_4 = 0{,}88\cdot10^3\cdot17{,}65\cdot10^{-3} = 15{,}53\,V$

$I_5 = \frac{V_5}{R_5} = \frac{15{,}53}{1\cdot10^3} = 15{,}53\,mA$; $I_6 = \frac{V_{69}}{R_{69}} = \frac{15{,}53}{7{,}07\cdot10^3} = 2{,}19\,mA$; $V_6 = R_6 I_6 = 1{,}5\cdot10^3\cdot2{,}19\cdot10^{-3} = 3{,}29\,V$

$V_{78} = V_7 = V_8 = R_{78} I_6 = 0{,}87\cdot10^3\cdot2{,}19\cdot10^{-3} = 1{,}9\,V$; $V_9 = R_9 I_6 = 4{,}7\cdot10^3\cdot2{,}19\cdot10^{-3} = 10{,}29\,V$

$V_2 = R_2 I_2 = 4{,}7\cdot10^3\cdot8{,}57\cdot10^{-3} = 40{,}28\,V$; $V_3 = R_3 I_2 = 3{,}9\cdot10^3\cdot8{,}57\cdot10^{-3} = 33{,}42\,V$

$I_7 = \frac{V_7}{R_7} = \frac{1{,}9}{6{,}8\cdot10^3} = 0{,}28\,mA$; $I_8 = \frac{V_8}{R_8} = \frac{1{,}9}{1\cdot10^3} = 1{,}9\,mA$

Riassumendo

$I_1 = 26{,}25\,mA$; $I_2 = 8{,}57\,mA$; $I_4 = 17{,}65\,mA$; $I_5 = 15{,}53\,mA$; $I_6 = 2{,}19\,mA$; $I_7 = 0{,}28\,mA$; $I_8 = 1{,}9\,mA$

$V_1 = 26{,}25\,V$; $V_2 = 40{,}28\,V$; $V_3 = 33{,}42\,V$; $V_4 = 58{,}24\,V$; $V_5 = 15{,}53\,V$; $V_6 = 3{,}29\,V$; $V_7 = V_8 = 1{,}9\,V$

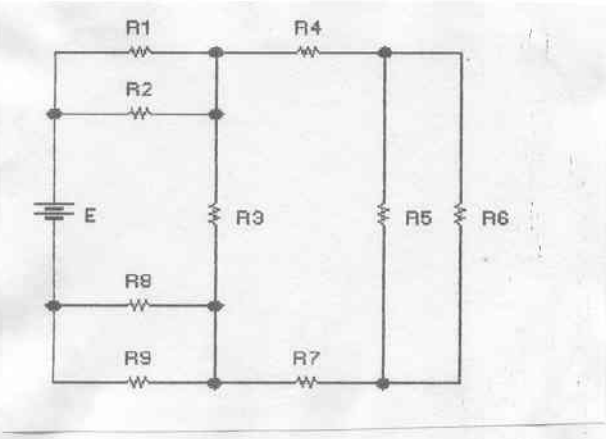
$V_9 = 10{,}29\,V$

3.- $P = \mathcal{E}\cdot I_1 = 100\cdot26{,}25\cdot10^{-3} = 2{,}625\,W$

4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 58{,}24\cdot17{,}65\cdot10^{-3} + 3{,}29\cdot2{,}19\cdot10^{-3} = 1{,}035\,W$

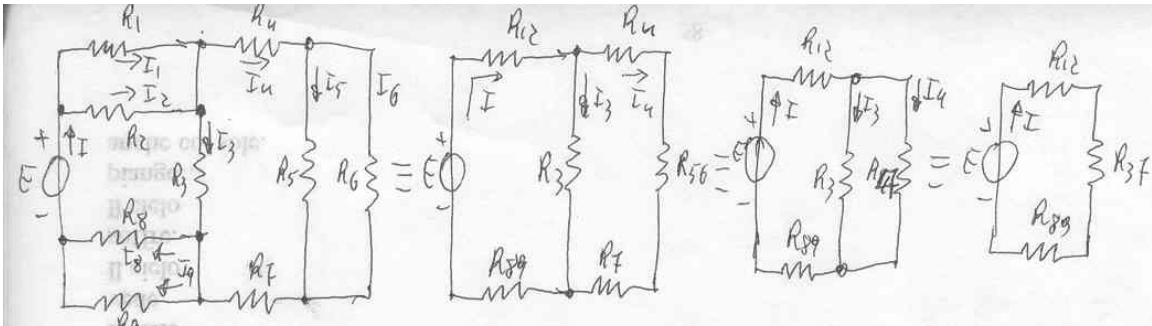
Del circuito di figura calcolare:

5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



E = 100 V ; R_1 = 1 KΩ ; R_2 = 4,7 KΩ ; R_3 = 3,9 KΩ ; R_4 = 3,3 KΩ ; R_5 = 1 KΩ ;

R_6 = 1,5 KΩ ; R_7 = 6,8 KΩ ; R_8 = 1 KΩ ; R_9 = 4,7 KΩ.



1.5

1.- $R_{12} = \frac{R_1 R_2}{R_1 + R_2} = \frac{1 \cdot 10^3 \cdot 4{,}7 \cdot 10^3}{1 \cdot 10^3 + 4{,}7 \cdot 10^3} = 0{,}82\,K\Omega$; $R_{89} = \frac{R_8 R_9}{R_8 + R_9} = \frac{1 \cdot 10^3 \cdot 4{,}7 \cdot 10^3}{1 \cdot 10^3 + 4{,}7 \cdot 10^3} = 0{,}82\,K\Omega$; $R_{56} = \frac{R_5 R_6}{R_5 + R_6} = \frac{1 \cdot 10^3 \cdot 1{,}5 \cdot 10^3}{1 \cdot 10^3 + 1{,}5 \cdot 10^3} = 0{,}6\,K\Omega$

$R_{47} = R_4 + R_{56} + R_7 = 3{,}3 \cdot 10^3 + 0{,}6 \cdot 10^3 + 6{,}8 \cdot 10^3 = 10{,}7\,K\Omega$; $R_{37} = \frac{R_3 R_{47}}{R_3 + R_{47}} = \frac{3{,}9 \cdot 10^3 \cdot 10{,}7 \cdot 10^3}{3{,}9 \cdot 10^3 + 10{,}7 \cdot 10^3} = 2{,}86\,K\Omega$

$R_{eq} = R_{12} + R_{37} + R_{89} = 0{,}82 \cdot 10^3 + 2{,}86 \cdot 10^3 + 0{,}82 \cdot 10^3 = 4{,}5\,K\Omega$

2.- $I = \frac{E}{R_{eq}} = \frac{100}{4{,}5 \cdot 10^3} = 22{,}22\,mA$; $V_{12} = V_1 = V_2 = R_{12} I = 0{,}82 \cdot 10^3 \cdot 22{,}22 \cdot 10^{-3} = 18{,}22\,V$; $V_{89} = V_8 = V_9 = R_{89} I = 18{,}22\,V$

$V_{37} = V_3 = V_{47} = R_{37} I = 2{,}86 \cdot 10^3 \cdot 22{,}22 \cdot 10^{-3} = 63{,}55\,V$; $V_{12} + V_{89} + V_{37} = 18{,}22 + 18{,}22 + 63{,}55 = 100\,V$

$I_3 = \frac{V_3}{R_3} = \frac{63{,}55}{3{,}9 \cdot 10^3} = 16{,}29\,mA$; $I_4 = \frac{V_{47}}{R_{47}} = \frac{63{,}55}{10{,}7 \cdot 10^3} = 5{,}94\,mA$; $V_4 = R_4 I_4 = 3{,}3 \cdot 10^3 \cdot 5{,}94 \cdot 10^{-3} = 19{,}6\,V$

$V_{56} = V_5 = V_6 = R_{56} I_4 = 0{,}6 \cdot 10^3 \cdot 5{,}94 \cdot 10^{-3} = 3{,}56\,V$; $V_7 = R_7 I_4 = 6{,}8 \cdot 10^3 \cdot 5{,}94 \cdot 10^{-3} = 40{,}39\,V$

$I_1 = \frac{V_1}{R_1} = \frac{18{,}22}{1 \cdot 10^3} = 18{,}22\,mA$; $I_2 = \frac{V_2}{R_2} = \frac{18{,}22}{4{,}7 \cdot 10^3} = 3{,}87\,mA$; $I_5 = \frac{V_5}{R_5} = \frac{3{,}56}{1 \cdot 10^3} = 3{,}56\,mA$

$I_6 = \frac{V_6}{R_6} = \frac{3{,}56}{1{,}5 \cdot 10^3} = 2{,}37\,mA$; $I_8 = \frac{V_8}{R_8} = \frac{18{,}22}{1 \cdot 10^3} = 18{,}22\,mA$; $I_9 = \frac{V_9}{R_9} = \frac{18{,}22}{4{,}7 \cdot 10^3} = 3{,}87\,mA$

Riepilogo

$I_1 = 18{,}22\,mA$; $I_2 = 3{,}87\,mA$; $I_3 = 16{,}29\,mA$; $I_4 = 5{,}94\,mA$; $I_5 = 3{,}56\,mA$; $I_6 = 2{,}37\,mA$

$I_8 = 18{,}22\,mA$; $I_9 = 3{,}87\,mA$; $V_1 = 18{,}22\,V$; $V_2 = 18{,}22\,V$; $V_3 = 63{,}55\,V$; $V_4 = 19{,}6\,V$; $V_5 = V_6 = 3{,}56\,V$

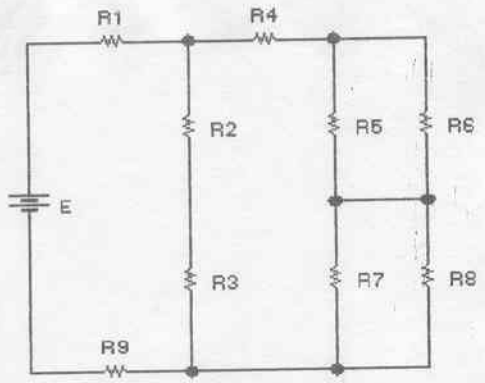
$V_7 = 40{,}39\,V$; $V_8 = V_9 = 18{,}22\,V$

3.- $P = E \cdot I = 100 \cdot 22{,}22 \cdot 10^{-3} = 2{,}222\,W$

4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 19{,}6 \cdot 5{,}94 \cdot 10^{-3} + 3{,}56 \cdot 2{,}37 \cdot 10^{-3} = 0{,}125\,W$

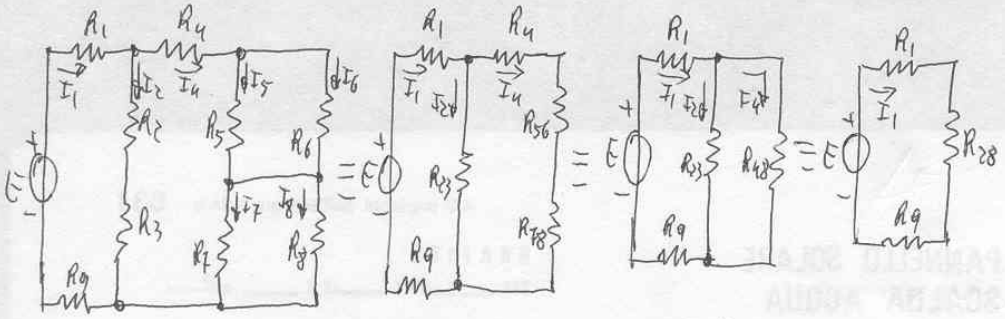
Del circuito di figura calcolare:

5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



$E = 100\ V$; $R_1 = 1\ K\Omega$; $R_2 = 4{,}7\ K\Omega$; $R_3 = 3{,}9K\Omega$; $R_4 = 3{,}3\ K\Omega$; $R_5 = 1\ K\Omega$; $R_6 = 1{,}5\ K\Omega$; $R_7 = 6{,}8\ K\Omega$; $R_8 = 1\ K\Omega$; $R_9 = 4{,}7\ K\Omega$.

1.7



1.- $R_{23} = R_2 + R_3 = 4{,}7\cdot10^3 + 3{,}9\cdot10^3 = 8{,}6\,K\Omega$; $R_{56} = \frac{R_5 R_6}{R_5+R_6} = \frac{1\cdot10^3\cdot1{,}5\cdot10^3}{1\cdot10^3+1{,}5\cdot10^3} = 0{,}6\,K\Omega$; $R_{78} = \frac{R_7 R_8}{R_7+R_8} = \frac{0{,}8\cdot10^3\cdot1\cdot10^3}{0{,}8\cdot10^3+1\cdot10^3} = 0{,}87\,K\Omega$

$R_{48} = R_4 + R_{56} + R_{78} = 3{,}3\cdot10^3 + 0{,}6\cdot10^3 + 0{,}87\cdot10^3 = 4{,}77\,K\Omega$; $R_{28} = \frac{R_{23} R_{48}}{R_{23}+R_{48}} = \frac{8{,}6\cdot10^3\cdot4{,}77\cdot10^3}{8{,}6\cdot10^3+4{,}77\cdot10^3} = 3{,}07\,K\Omega$

$R_{eq} = R_1 + R_{28} + R_9 = 1\cdot10^3 + 3{,}07\cdot10^3 + 4{,}7\cdot10^3 = 8{,}77\,K\Omega$

2.- $I_1 = \frac{E}{R_{eq}} = \frac{100}{8{,}77\cdot10^3} = 11{,}4\,mA$; $V_1 = R_1 I_1 = 1\cdot10^3\cdot11{,}4\cdot10^{-3} = 11{,}4\,V$; $V_{28} = V_{23} = V_{48} = R_{28} I_1 = 3{,}07\cdot10^3\cdot11{,}4\cdot10^{-3} = 35\,V$

$V_9 = R_9 I_1 = 4{,}7\cdot10^3\cdot11{,}4\cdot10^{-3} = 53{,}58\,V$; $V_1 + V_{28} + V_9 = 11{,}4 + 35 + 53{,}58 = 100\,V$

$I_2 = \frac{V_{23}}{R_{23}} = \frac{35}{8{,}6\cdot10^3} = 4{,}07\,mA$; $I_4 = \frac{V_{48}}{R_{48}} = \frac{35}{4{,}77\cdot10^3} = 7{,}34\,mA$; $V_4 = R_4 I_4 = 3{,}3\cdot10^3\cdot7{,}34\cdot10^{-3} = 24{,}22\,V$

$V_{56} = V_5 = V_6 = R_{56} I_4 = 0{,}6\cdot10^3\cdot7{,}34\cdot10^{-3} = 4{,}4\,V$; $V_{78} = V_7 = V_8 = R_{78} I_4 = 0{,}87\cdot10^3\cdot7{,}34\cdot10^{-3} = 6{,}38\,V$

$V_2 = R_2 I_2 = 4{,}7\cdot10^3\cdot4{,}07\cdot10^{-3} = 19{,}13\,V$; $V_3 = R_3 I_2 = 3{,}9\cdot10^3\cdot4{,}07\cdot10^{-3} = 15{,}87\,V$; $I_5 = \frac{V_5}{R_5} = \frac{4{,}4}{1\cdot10^3} = 4{,}4\,mA$

$I_6 = \frac{V_5}{R_6} = \frac{4{,}4}{1{,}5\cdot10^3} = 2{,}93\,mA$; $I_7 = \frac{V_7}{R_7} = \frac{6{,}38}{0{,}8\cdot10^3} = 0{,}94\,mA$; $I_8 = \frac{V_8}{R_8} = \frac{6{,}38}{1\cdot10^3} = 6{,}38\,mA$

Riassumendo

$I_1 = 11{,}4\,mA$; $I_2 = 4{,}07\,mA$; $I_4 = 7{,}34\,mA$; $I_5 = 4{,}4\,mA$; $I_6 = 2{,}93\,mA$; $I_7 = 0{,}94\,mA$

$I_8 = 6{,}38\,mA$; $V_1 = 11{,}4\,V$; $V_2 = 19{,}13\,V$; $V_3 = 15{,}87\,V$; $V_4 = 24{,}22\,V$; $V_5 = V_6 = 4{,}4\,V$

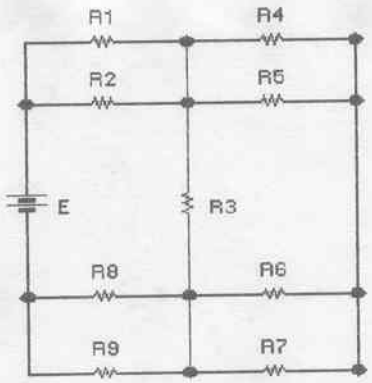
$V_7 = V_8 = 6{,}38\,V$; $V_9 = 53{,}58\,V$

3.- $P = E\cdot I_1 = 100\cdot11{,}4\cdot10^{-3} = 1{,}14\,W$

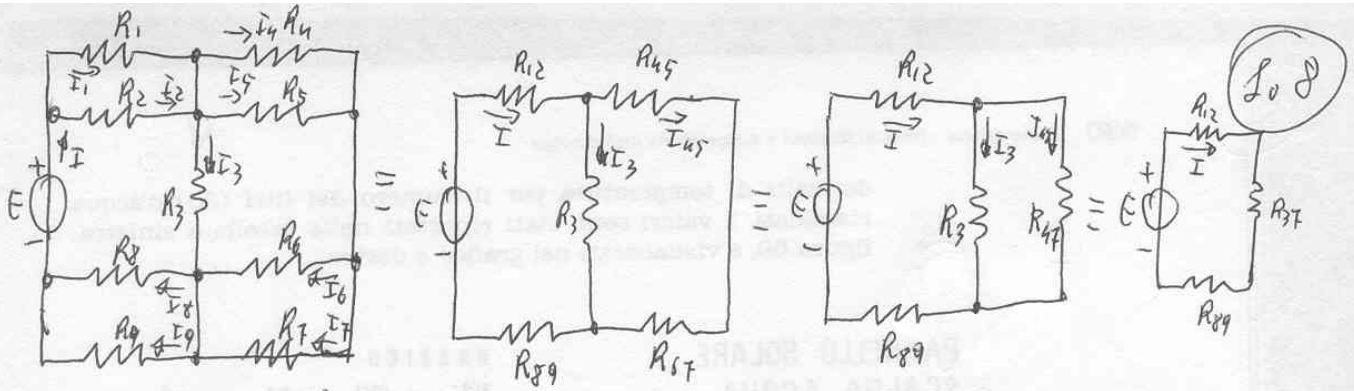
4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 24{,}22\cdot7{,}34\cdot10^{-3} + 4{,}4\cdot2{,}93\cdot10^{-3} = 0{,}19\,W$

Del circuito di figura calcolare:

5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



E = 100 V ; R_1 = 1 KΩ ; R_2 = 4,7 KΩ ; R_3 = 3,9KΩ ; R_4 = 3,3 KΩ ; R_5 = 1 KΩ ; R_6 = 1,5 KΩ ; R_7 = 6,8 KΩ ; R_8 = 1 KΩ ; R_9 = 4,7 KΩ.



1.- $R_{12} = \frac{R_1 R_2}{R_1 + R_2} = \frac{1 \cdot 10^3 \cdot 4{,}7 \cdot 10^3}{1 \cdot 10^3 + 4{,}7 \cdot 10^3} = 0{,}82\,K\Omega$; $R_{45} = \frac{R_4 R_5}{R_4 + R_5} = \frac{33 \cdot 10^3 \cdot 1 \cdot 10^3}{33 \cdot 10^3 + 1 \cdot 10^3} = 0{,}97\,K\Omega$;

$R_{67} = \frac{R_6 R_7}{R_6 + R_7} = \frac{1{,}5 \cdot 10^3 \cdot 6{,}8 \cdot 10^3}{1{,}5 \cdot 10^3 + 6{,}8 \cdot 10^3} = 1{,}23\,K\Omega$; $R_{89} = \frac{R_8 R_9}{R_8 + R_9} = \frac{1 \cdot 10^3 \cdot 4{,}7 \cdot 10^3}{1 \cdot 10^3 + 4{,}7 \cdot 10^3} = 0{,}82\,K\Omega$

$R_{47} = R_{45} + R_{67} = 0{,}77 \cdot 10^3 + 1{,}23 \cdot 10^3 = 2\,K\Omega$; $R_{37} = \frac{R_3 R_{47}}{R_3 + R_{47}} = \frac{39 \cdot 10^3 \cdot 2 \cdot 10^3}{39 \cdot 10^3 + 2 \cdot 10^3} = 1{,}32\,K\Omega$

$R_{eq} = R_{12} + R_{37} + R_{89} = 0{,}82 \cdot 10^3 + 1{,}32 \cdot 10^3 + 0{,}82 \cdot 10^3 = 2{,}96\,K\Omega$

2.- $I = \frac{E}{R_{eq}} = \frac{100}{2{,}96 \cdot 10^3} = 33{,}78\,mA$; $V_{12} = V_1 = V_2 = R_{12} I = 0{,}82 \cdot 10^3 \cdot 33{,}78 \cdot 10^{-3} = 27{,}7\,V$

$V_{37} = V_3 = V_{47} = R_{37} I = 1{,}32 \cdot 10^3 \cdot 33{,}78 \cdot 10^{-3} = 44{,}59\,V$; $V_{89} = V_8 = V_9 = R_{89} I = 0{,}82 \cdot 10^3 \cdot 33{,}78 \cdot 10^{-3} = 27{,}7\,V$

$I_3 = \frac{V_3}{R_3} = \frac{44{,}59}{39 \cdot 10^3} = 11{,}43\,mA$; $I_{45} = \frac{V_{47}}{R_{47}} = \frac{44{,}59}{2 \cdot 10^3} = 22{,}29\,mA$;

$V_{45} = V_4 = V_5 = R_{45} I_{45} = 0{,}77 \cdot 10^3 \cdot 22{,}29 \cdot 10^{-3} = 17{,}16\,V$; $V_{67} = V_6 = V_7 = R_{67} I_{45} = 1{,}23 \cdot 10^3 \cdot 22{,}29 \cdot 10^{-3} = 27{,}41\,V$

$I_1 = \frac{V_1}{R_1} = \frac{27{,}7}{1 \cdot 10^3} = 27{,}7\,mA$; $I_2 = \frac{V_2}{R_2} = \frac{27{,}7}{4{,}7 \cdot 10^3} = 5{,}89\,mA$; $I_4 = \frac{V_4}{R_4} = \frac{17{,}16}{3{,}3 \cdot 10^3} = 5{,}2\,mA$

$I_5 = \frac{V_5}{R_5} = \frac{17{,}16}{1 \cdot 10^3} = 17{,}16\,mA$; $I_6 = \frac{V_6}{R_6} = \frac{27{,}41}{1{,}5 \cdot 10^3} = 18{,}27\,mA$; $I_7 = \frac{V_7}{R_7} = \frac{27{,}41}{6{,}8 \cdot 10^3} = 4{,}03\,mA$

$I_8 = \frac{V_8}{R_8} = \frac{27{,}7}{1 \cdot 10^3} = 27{,}7\,mA$; $I_9 = \frac{V_9}{R_9} = \frac{27{,}7}{4{,}7 \cdot 10^3} = 5{,}89\,mA$

Risultati

$I_1 = 27{,}7\,mA$; $I_2 = 5{,}89\,mA$; $I_3 = 11{,}43\,mA$; $I_4 = 5{,}2\,mA$; $I_5 = 17{,}16\,mA$; $I_6 = 18{,}27\,mA$

$I_7 = 4{,}03\,mA$; $I_8 = 27{,}7\,mA$; $I_9 = 5{,}89\,mA$; $V_1 = V_2 = 27{,}7\,V$; $V_3 = 44{,}59\,V$;

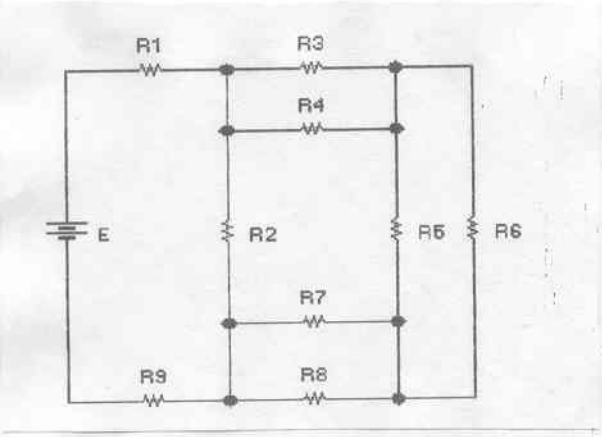
$V_4 = V_5 = 17{,}16\,V$; $V_6 = V_7 = 27{,}41\,V$; $V_8 = V_9 = 27{,}7\,V$; $V_{12} + V_3 + V_{89} = 27{,}7 + 44{,}59 + 27{,}7 \cong 100\,V$

3.- $P = E \cdot I = 100 \cdot 33{,}78 \cdot 10^{-3} = 3{,}378\,W$

4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 17{,}16 \cdot 5{,}2 \cdot 10^{-3} + 27{,}41 \cdot 18{,}27 \cdot 10^{-3} = 0{,}59\,W$

Del circuito di figura calcolare:

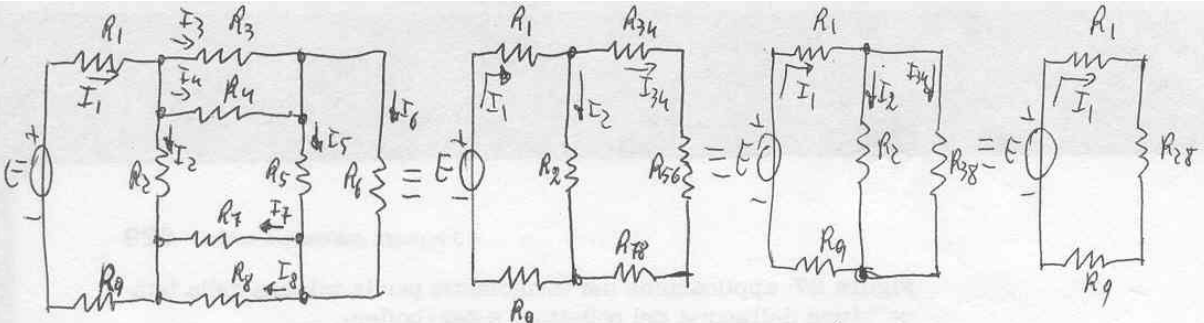
5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



$E = 100\ V$; $R_1 = 1\ K\Omega$; $R_2 = 4{,}7\ K\Omega$; $R_3 = 3{,}9K\Omega$; $R_4 = 3{,}3\ K\Omega$; $R_5 = 1\ K\Omega$;

$R_6 = 1{,}5\ K\Omega$; $R_7 = 6{,}8\ K\Omega$; $R_8 = 1\ K\Omega$; $R_9 = 4{,}7\ K\Omega$.

(1.9)



1.- $R_{34} = \frac{R_3 R_4}{R_3 + R_4} = \frac{3{,}9\cdot10^3 \cdot 3{,}3\cdot10^3}{3{,}9\cdot10^3 + 3{,}3\cdot10^3} = 1{,}79\,K\Omega$; $R_{56} = \frac{R_5 R_6}{R_5 + R_6} = \frac{1\cdot10^3 \cdot 1{,}5\cdot10^3}{1\cdot10^3 + 1{,}5\cdot10^3} = 0{,}6\,K\Omega$;

$R_{78} = \frac{R_7 R_8}{R_7 + R_8} = \frac{6{,}8\cdot10^3 \cdot 1\cdot10^3}{6{,}8\cdot10^3 + 1\cdot10^3} = 0{,}87\,K\Omega$; $R_{38} = R_{34} + R_{56} + R_{78} = 1{,}79\cdot10^3 + 0{,}6\cdot10^3 + 0{,}87\cdot10^3 = 3{,}26\,K\Omega$

$R_{28} = \frac{R_2 R_{38}}{R_2 + R_{38}} = \frac{4{,}7\cdot10^3 \cdot 3{,}26\cdot10^3}{4{,}7\cdot10^3 + 3{,}26\cdot10^3} = 1{,}92\,K\Omega$; $R_{eq} = R_1 + R_{28} + R_9 = 1\cdot10^3 + 1{,}92\cdot10^3 + 4{,}7\cdot10^3 = 7{,}62\,K\Omega$

2.- $I_1 = \frac{E}{R_{eq}} = \frac{100}{7{,}62\cdot10^3} = 13{,}12\,mA$; $V_1 = R_1 I_1 = 1\cdot10^3 \cdot 13{,}12\cdot10^{-3} = 13{,}12\,V$; $V_9 = R_9 I_1 = 4{,}7\cdot10^3 \cdot 13{,}12\cdot10^{-3} = 61{,}6\,V$

$V_{28} = V_2 = V_{38} = R_{28} I_1 = 1{,}92\cdot10^3 \cdot 13{,}12\cdot10^{-3} = 25{,}19\,V$; $I_2 = \frac{V_2}{R_2} = \frac{25{,}19}{4{,}7\cdot10^3} = 5{,}36\,mA$;

$I_{34} = \frac{V_{38}}{R_{38}} = \frac{25{,}19}{3{,}26\cdot10^3} = 7{,}73\,mA$; $V_{34} = V_3 = V_4 = R_{34} I_{34} = 1{,}79\cdot10^3 \cdot 7{,}73\cdot10^{-3} = 13{,}83\,V$

$V_{56} = V_5 = V_6 = R_{56} I_{34} = 0{,}6\cdot10^3 \cdot 7{,}73\cdot10^{-3} = 4{,}64\,V$; $V_{78} = V_7 = V_8 = R_{78} I_{34} = 0{,}87\cdot10^3 \cdot 7{,}73\cdot10^{-3} = 6{,}72\,V$

$I_3 = \frac{V_3}{R_3} = \frac{13{,}83}{3{,}9\cdot10^3} = 3{,}55\,mA$; $I_4 = \frac{V_4}{R_4} = \frac{13{,}83}{3{,}3\cdot10^3} = 4{,}19\,mA$; $I_5 = \frac{V_5}{R_5} = \frac{4{,}64}{1\cdot10^3} = 4{,}64\,mA$

$I_6 = \frac{V_6}{R_6} = \frac{4{,}64}{1{,}5\cdot10^3} = 3{,}09\,mA$; $I_7 = \frac{V_7}{R_7} = \frac{6{,}72}{6{,}8\cdot10^3} = 0{,}99\,mA$; $I_8 = \frac{V_8}{R_8} = \frac{6{,}72}{1\cdot10^3} = 6{,}72\,mA$

Riassumendo

$I_1 = 13{,}12\,mA$; $I_2 = 5{,}36\,mA$; $I_3 = 3{,}55\,mA$; $I_4 = 4{,}19\,mA$; $I_5 = 4{,}64\,mA$; $I_6 = 3{,}09\,mA$;

$I_7 = 0{,}99\,mA$; $I_8 = 6{,}72\,mA$; $V_1 = 13{,}12\,V$; $V_2 = 25{,}19\,V$; $V_3 = V_4 = 13{,}83\,V$; $V_5 = V_6 = 4{,}64\,V$

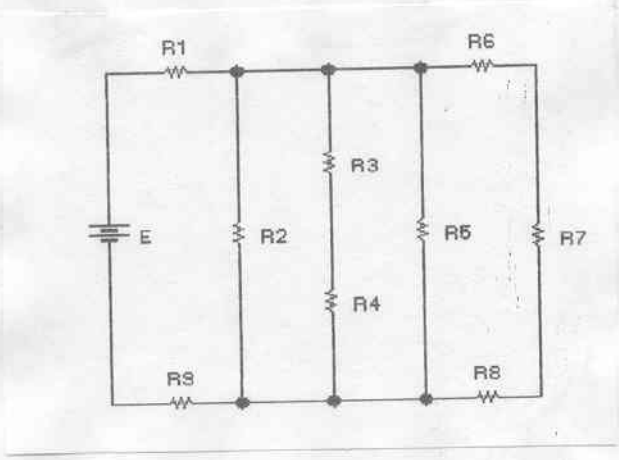
$V_7 = V_8 = 6{,}72\,V$; $V_9 = 61{,}68\,V$

3.- $P = E \cdot I_1 = 100 \cdot 13{,}12\cdot10^{-3} = 1{,}312\,W$

4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 13{,}83 \cdot 4{,}19\cdot10^{-3} + 4{,}64 \cdot 3{,}09\cdot10^{-3} = 72{,}28\,mW$

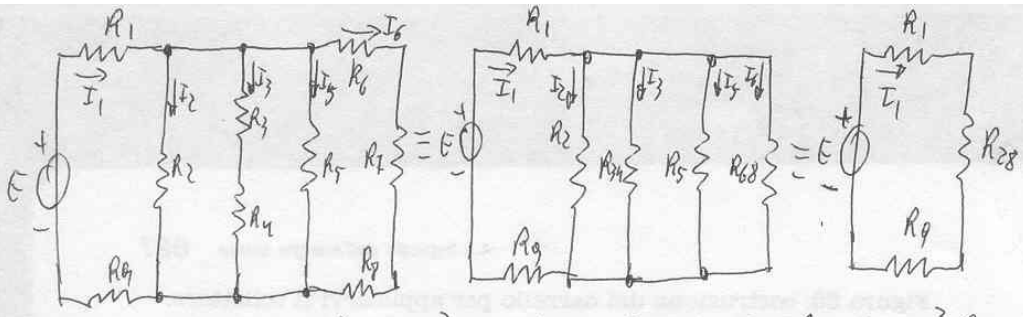
Del circuito di figura calcolare:

5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



$E = 100\ V$; $R_1 = 1\ K\Omega$; $R_2 = 4{,}7\ K\Omega$; $R_3 = 3{,}9K\Omega$; $R_4 = 3{,}3\ K\Omega$; $R_5 = 1\ K\Omega$; $R_6 = 1{,}5\ K\Omega$; $R_7 = 6{,}8\ K\Omega$; $R_8 = 1\ K\Omega$; $R_9 = 4{,}7\ K\Omega$.

2.10



1.- $R_{34} = R_3 + R_4 = 3{,}9\cdot10^3 + 3{,}3\cdot10^3 = 7{,}2\,k\Omega$; $R_{68} = R_6 + R_7 + R_8 = 1{,}5\cdot10^3 + 6{,}8\cdot10^3 + 1\cdot10^3 = 9{,}3\,k\Omega$

$$R_{28} = \frac{1}{\frac{1}{R_2} + \frac{1}{R_{34}} + \frac{1}{R_5} + \frac{1}{R_{68}}} = \frac{1}{\frac{1}{4{,}7\cdot10^3} + \frac{1}{7{,}2\cdot10^3} + \frac{1}{1\cdot10^3} + \frac{1}{9{,}3\cdot10^3}} = 0{,}885\,k\Omega$$

$R_{eq} = R_1 + R_{28} + R_9 = 1\cdot10^3 + 0{,}185\cdot10^3 + 4{,}7\cdot10^3 = 6{,}385\,k\Omega$

2.- $I_1 = \frac{E}{R_{eq}} = \frac{100}{6{,}385\cdot10^3} = 15{,}66\,mA$; $V_1 = R_1 I_1 = 1\cdot10^3 \cdot 15{,}66\cdot10^{-3} = 15{,}66\,V$;

$V_{28} = V_2 = V_{34} = V_5 = V_{68} = R_{28} I_1 = 0{,}885\cdot10^3 \cdot 15{,}66\cdot10^{-3} = 10{,}73\,V$; $V_9 = R_9 I_1 = 4{,}7\cdot10^3 \cdot 15{,}66\cdot10^{-3} = 73{,}6\,V$

$I_2 = \frac{V_2}{R_2} = \frac{10{,}73}{4{,}7\cdot10^3} = 2{,}28\,mA$; $I_3 = \frac{V_{34}}{R_{34}} = \frac{10{,}73}{7{,}2\cdot10^3} = 1{,}49\,mA$; $I_5 = \frac{V_5}{R_5} = \frac{10{,}73}{1\cdot10^3} = 10{,}73\,mA$

$I_6 = \frac{V_{68}}{R_{68}} = \frac{10{,}73}{9{,}3\cdot10^3} = 1{,}15\,mA$; $V_3 = R_3 I_3 = 3{,}9\cdot10^3 \cdot 1{,}49\cdot10^{-3} = 5{,}8\,V$; $V_4 = R_4 I_3 = 3{,}3\cdot10^3 \cdot 1{,}49\cdot10^{-3} = 4{,}92\,V$

$V_5 = R_6 I_6 = 1{,}5\cdot10^3 \cdot 1{,}15\cdot10^{-3} = 1{,}72\,V$; $V_7 = R_7 I_6 = 6{,}8\cdot10^3 \cdot 1{,}15\cdot10^{-3} = 7{,}82\,V$;

$V_8 = R_8 I_6 = 1\cdot10^3 \cdot 1{,}15\cdot10^{-3} = 1{,}15\,V$ -

Resumiendo

$I_1 = 15{,}66\,mA$; $I_2 = 2{,}28\,mA$; $I_3 = 1{,}49\,mA$; $I_5 = 10{,}73\,mA$; $I_6 = 1{,}15\,mA$; $V_1 = 15{,}66\,V$

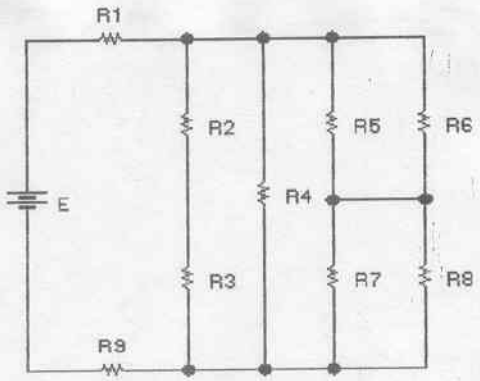
$V_2 = V_5 = 10{,}73\,V$; $V_3 = 5{,}8\,V$; $V_4 = 4{,}92\,V$; $V_8 = 1{,}72\,V$; $V_7 = 7{,}82\,V$; $V_8 = 1{,}15\,V$ -

3.- $P = E \cdot I_1 = 100 \cdot 15{,}66\cdot10^{-3} = 1{,}566\,W$

4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 4{,}92\cdot1{,}49\cdot10^{-3} + 1{,}72\cdot1{,}15\cdot10^{-3} = 9{,}3\,mW$

Del circuito di figura calcolare:

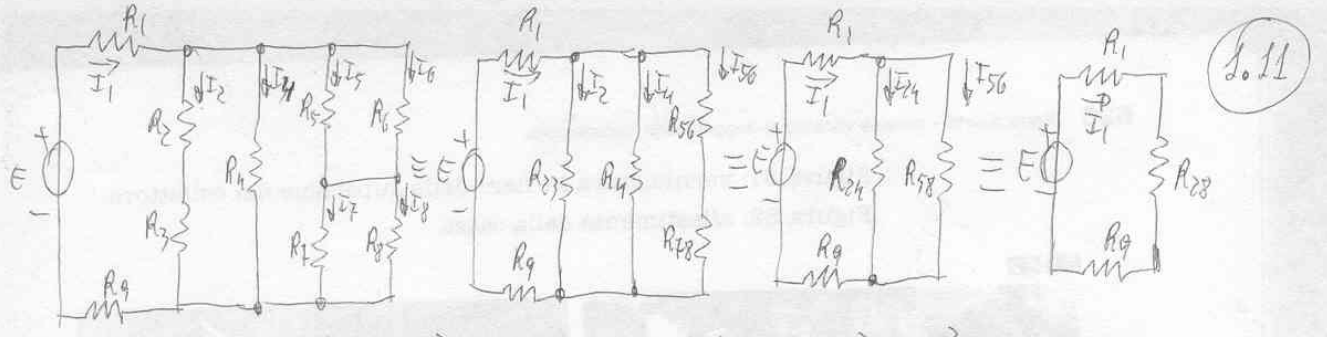
5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



$E = 100\ V$; $R_1 = 1\ K\Omega$; $R_2 = 4{,}7\ K\Omega$; $R_3 = 3{,}9K\Omega$; $R_4 = 3{,}3\ K\Omega$; $R_5 = 1\ K\Omega$;

$R_6 = 1{,}5\ K\Omega$; $R_7 = 6{,}8\ K\Omega$; $R_8 = 1\ K\Omega$; $R_9 = 4{,}7\ K\Omega$.

1.11



1.- $R_{23} = R_2 + R_3 = 4{,}7\cdot10^3 + 3{,}9\cdot10^3 = 8{,}6\,K\Omega$; $R_{56} = \frac{R_5 R_6}{R_5+R_6} = \frac{1\cdot10^3\cdot1{,}5\cdot10^3}{1\cdot10^3+1{,}5\cdot10^3} = 0{,}6\,K\Omega$

$R_{78} = \frac{R_7 R_8}{R_7+R_8} = \frac{6{,}8\cdot10^3\cdot1\cdot10^3}{6{,}8\cdot10^3+1\cdot10^3} = 0{,}87\,K\Omega$; $R_{58} = R_{56} + R_{78} = 0{,}6\cdot10^3 + 0{,}87\cdot10^3 = 1{,}47\,K\Omega$

$R_{24} = \frac{R_{23} R_4}{R_{23}+R_4} = \frac{8{,}6\cdot10^3\cdot3{,}3\cdot10^3}{8{,}6\cdot10^3+3{,}3\cdot10^3} = 2{,}38\,K\Omega$; $R_{28} = \frac{R_{24} R_{58}}{R_{24}+R_{58}} = \frac{2{,}38\cdot10^3\cdot1{,}47\cdot10^3}{2{,}38\cdot10^3+1{,}47\cdot10^3} = 0{,}91\,K\Omega$

$R_{eq} = R_1 + R_{28} + R_9 = 1\cdot10^3 + 0{,}91\cdot10^3 + 4{,}7\cdot10^3 = 6{,}61\,K\Omega$

2.- $I_1 = \frac{E}{R_{eq}} = \frac{100}{6{,}61\cdot10^3} = 15{,}13\,mA$; $V_1 = R_1 I_1 = 1\cdot10^3\cdot15{,}13\cdot10^{-3} = 15{,}13\,V$;

$V_{28} = V_{24} = V_{58} = V_{23} = V_4 = R_{28} I_1 = 0{,}91\cdot10^3\cdot15{,}13\cdot10^{-3} = 13{,}77\,V$; $V_9 = R_9 I_1 = 4{,}7\cdot10^3\cdot15{,}13\cdot10^{-3} = 71{,}11\,V$

$I_{56} = \frac{V_{58}}{R_{58}} = \frac{13{,}77}{1{,}47\cdot10^3} = 9{,}37\,mA$; $I_2 = \frac{V_{23}}{R_{23}} = \frac{13{,}77}{8{,}6\cdot10^3} = 1{,}6\,mA$; $I_4 = \frac{V_4}{R_4} = \frac{13{,}77}{3{,}3\cdot10^3} = 4{,}17\,mA$

$V_{56} = V_5 = V_6 = R_{56} I_{56} = 0{,}6\cdot10^3\cdot9{,}37\cdot10^{-3} = 5{,}62\,V$; $V_{78} = V_7 = V_8 = R_{78} I_{56} = 0{,}87\cdot10^3\cdot9{,}37\cdot10^{-3} = 8{,}15\,V$

$V_2 = R_2 I_2 = 4{,}7\cdot10^3\cdot1{,}6\cdot10^{-3} = 7{,}52\,V$; $V_3 = R_3 I_2 = 3{,}9\cdot10^3\cdot1{,}6\cdot10^{-3} = 6{,}24\,V$;

$I_5 = \frac{V_5}{R_5} = \frac{5{,}62}{1\cdot10^3} = 5{,}62\,mA$; $I_6 = \frac{V_6}{R_6} = \frac{5{,}62}{1{,}5\cdot10^3} = 3{,}75\,mA$; $I_7 = \frac{V_7}{R_7} = \frac{8{,}15}{6{,}8\cdot10^3} = 1{,}2\,mA$

$I_8 = \frac{V_8}{R_8} = \frac{8{,}15}{1\cdot10^3} = 8{,}15\,mA$

Resumiendo

$I_1 = 15{,}13\,mA$; $I_2 = 1{,}6\,mA$; $I_4 = 4{,}17\,mA$; $I_5 = 5{,}62\,mA$; $I_6 = 3{,}75\,mA$; $I_7 = 1{,}2\,mA$

$I_8 = 8{,}15\,mA$; $V_1 = 15{,}13\,V$; $V_2 = 7{,}52\,V$; $V_3 = 6{,}24\,V$; $V_4 = 13{,}77\,V$; $V_5 = V_6 = 5{,}62\,V$

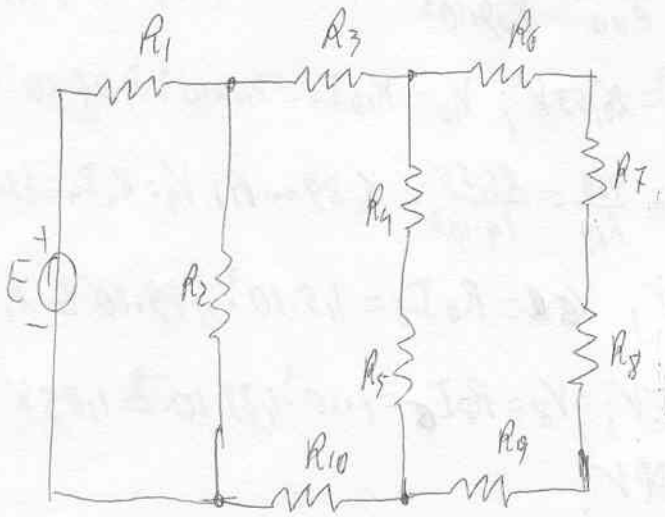
$V_7 = V_8 = 8{,}15\,V$

3.- $P = E\cdot I_1 = 100\cdot15{,}13\cdot10^{-3} = 1{,}513\,W$

4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 13{,}77\cdot4{,}17\cdot10^{-3} + 5{,}62\cdot3{,}75\cdot10^{-3} = 78{,}5\,mW$

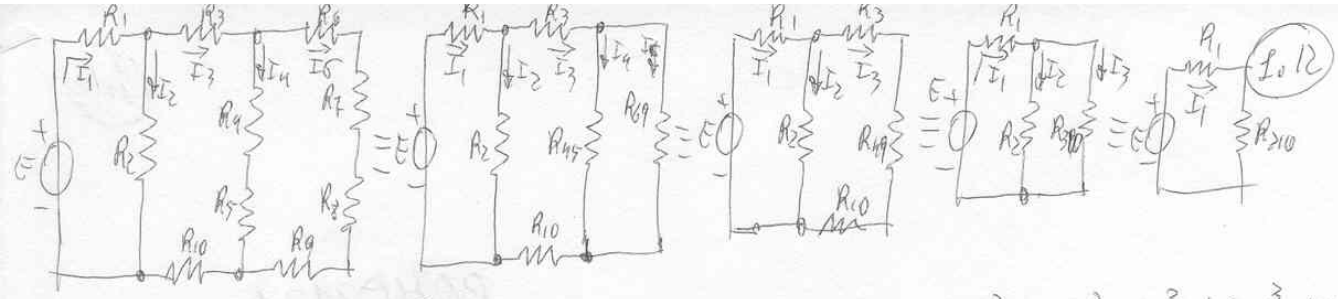
Del circuito di figura calcolare:

5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



$E = 100$ V ; $R_1 = 1$ KΩ ; $R_2 = 4{,}7$ KΩ ; $R_3 = 3{,}9$KΩ ; $R_4 = 3{,}3$ KΩ ; $R_5 = 1$ KΩ ;

$R_6 = 1{,}5$ KΩ ; $R_7 = 6{,}8$ KΩ ; $R_8 = 1$ KΩ ; $R_9 = 4{,}7$ KΩ ; $R_{10} = 2{,}2$ KΩ .



1.12

1.- $R_{45} = R_4 + R_5 = 3{,}3\cdot10^3 + 1\cdot10^3 = 4{,}3\ K\Omega$; $R_{69} = R_6 + R_7 + R_8 + R_9 = 1{,}5\cdot10^3 + 6{,}8\cdot10^3 + 1\cdot10^3 + 4{,}7\cdot10^3 = 14\ K\Omega$

$R_{49} = \dfrac{R_{45} R_{69}}{R_{45} + R_{69}} = \dfrac{4{,}3\cdot10^3 \cdot 14\cdot10^3}{4{,}3\cdot10^3 + 14\cdot10^3} = 3{,}29\ K\Omega$; $R_{310} = R_3 + R_{49} + R_{10} = 3{,}9\cdot10^3 + 3{,}29\cdot10^3 + 2{,}2\cdot10^3 = 9{,}39\ K\Omega$

$R_{210} = \dfrac{R_2 R_{310}}{R_2 + R_{310}} = \dfrac{4{,}7\cdot10^3 \cdot 9{,}39\cdot10^3}{4{,}7\cdot10^3 + 9{,}39\cdot10^3} = 3{,}13\ K\Omega$; $R_{eq} = R_1 + R_{210} = 1\cdot10^3 + 3{,}13\cdot10^3 = 4{,}13\ K\Omega$

2.- $I_1 = \dfrac{E}{R_{eq}} = \dfrac{100}{4{,}13\cdot10^3} = 24{,}2\ mA$; $V_1 = R_1 I_1 = 1\cdot10^3 \cdot 24{,}2\cdot10^{-3} = 24{,}2\ V$; $V_{210} = V_2 = V_{310} = R_{210} I_1 = 3{,}13\cdot10^3 \cdot 24{,}2\cdot10^{-3} = 75{,}75\ V$

$I_2 = \dfrac{V_2}{R_2} = \dfrac{75{,}75}{4{,}7\cdot10^3} = 16{,}12\ mA$; $I_3 = \dfrac{V_{310}}{R_{310}} = \dfrac{75{,}75}{9{,}39\cdot10^3} = 8{,}07\ mA$; $V_3 = R_3 I_3 = 3{,}9\cdot10^3 \cdot 8{,}07\cdot10^{-3} = 31{,}47\ V$

$V_{49} = V_{45} = V_{69} = R_{49} I_3 = 3{,}29\cdot10^3 \cdot 8{,}07\cdot10^{-3} = 26{,}55\ V$; $V_{10} = R_{10} I_3 = 2{,}2\cdot10^3 \cdot 8{,}07\cdot10^{-3} = 17{,}75\ V$;

$I_4 = \dfrac{V_{45}}{R_{45}} = \dfrac{26{,}55}{4{,}3\cdot10^3} = 6{,}17\ mA$; $I_6 = \dfrac{V_{69}}{R_{69}} = \dfrac{26{,}55}{14\cdot10^3} = 1{,}89\ mA$; $V_4 = R_4 I_4 = 3{,}3\cdot10^3 \cdot 6{,}17\cdot10^{-3} = 20{,}36\ V$

$V_5 = R_5 I_4 = 1\cdot10^3 \cdot 6{,}17\cdot10^{-3} = 6{,}17\ V$; $V_6 = R_6 I_6 = 1{,}5\cdot10^3 \cdot 1{,}89\cdot10^{-3} = 2{,}83\ V$

$V_7 = R_7 I_6 = 6{,}8\cdot10^3 \cdot 1{,}89\cdot10^{-3} = 12{,}85\ V$; $V_8 = R_8 I_6 = 1\cdot10^3 \cdot 1{,}89\cdot10^{-3} = 1{,}89\ V$

$V_9 = R_9 I_6 = 4{,}7\cdot10^3 \cdot 1{,}89\cdot10^{-3} = 8{,}88\ V$

Riassumendo

$I_1 = 24{,}2\ mA$; $I_2 = 16{,}12\ mA$; $I_3 = 8{,}07\ mA$; $I_4 = 6{,}17\ mA$; $I_6 = 1{,}89\ mA$;

$V_1 = 24{,}2\ V$; $V_2 = 75{,}75\ V$; $V_3 = 31{,}47\ V$; $V_4 = 6{,}24\ V$; $V_5 = 6{,}17\ V$; $V_6 = 2{,}83\ V$

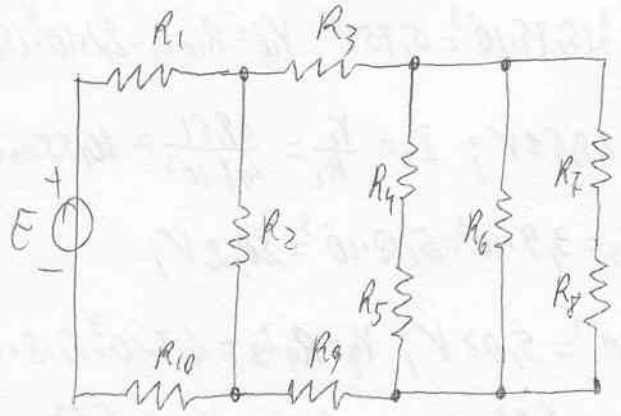
$V_7 = 12{,}85\ V$; $V_8 = 1{,}89\ V$; $V_9 = 8{,}88\ V$; $V_{10} = 17{,}75\ V$

3.- $P = E \cdot I_1 = 100 \cdot 24{,}2\cdot10^{-3} = 2{,}42\ W$

4.- $P_{46} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 20{,}36 \cdot 6{,}17\cdot10^{-3} + 2{,}83 \cdot 1{,}89\cdot10^{-3} = 131\ mW$

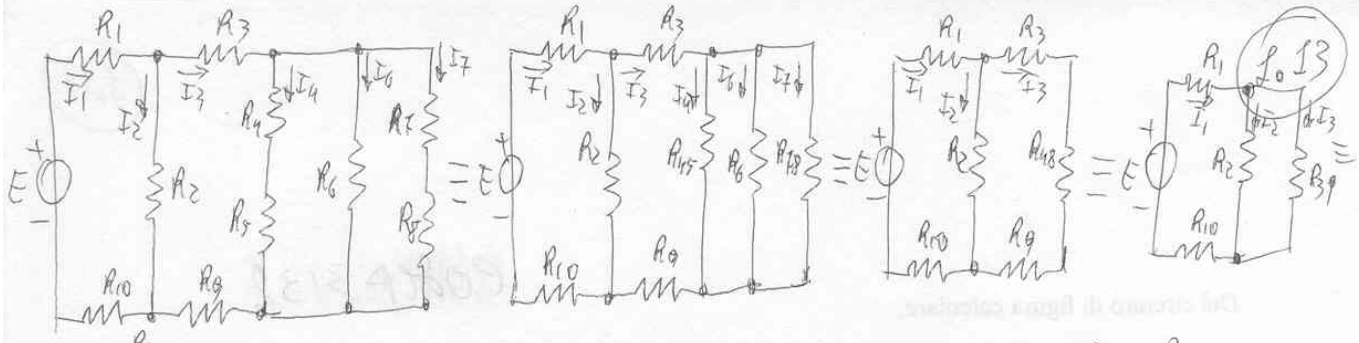
Del circuito di figura calcolare:

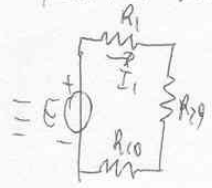
5. La resistenza equivalente vista dal generatore.
6. La corrente e la differenza di potenziale di ogni resistenza.
7. La potenza erogata dal generatore.
8. La potenza complessivamente assorbita dalle resistenze R_4 e R_6.



$E = 100\ V$; $R_1 = 1\ K\Omega$; $R_2 = 4{,}7\ K\Omega$; $R_3 = 3{,}9K\Omega$; $R_4 = 3{,}3\ K\Omega$; $R_5 = 1\ K\Omega$;

$R_6 = 1{,}5\ K\Omega$; $R_7 = 6{,}8\ K\Omega$; $R_8 = 1\ K\Omega$; $R_9 = 4{,}7\ K\Omega$; $R_{10} = 2{,}2\ K\Omega$.





$I_0 - R_{45} = R_4 + R_5 = 3{,}3\cdot10^3 + 1\cdot10^3 = 4{,}3\,K\Omega$; $R_{78} = R_7 + R_8 = 6{,}8\cdot10^3 + 1\cdot10^3 = 7{,}8\,K\Omega$

$$R_{48} = \frac{1}{\frac{1}{R_{45}} + \frac{1}{R_6} + \frac{1}{R_{78}}} = \frac{1}{\frac{1}{4{,}3\cdot10^3} + \frac{1}{1{,}5\cdot10^3} + \frac{1}{7{,}8\cdot10^3}} = 0{,}97\,K\Omega$$

$R_{39} = R_3 + R_{48} + R_9 = 3{,}9\cdot10^3 + 0{,}97\cdot10^3 + 4{,}7\cdot10^3 = 9{,}57\,K\Omega$

$R_{29} = \frac{R_2 R_{39}}{R_2 + R_{39}} = \frac{4{,}7\cdot10^3 \cdot 9{,}57\cdot10^3}{4{,}7\cdot10^3 + 9{,}57\cdot10^3} = 3{,}15\,K\Omega$; $R_{eq} = R_1 + R_{29} + R_{10} = 1\cdot10^3 + 3{,}15\cdot10^3 + 2{,}2\cdot10^3 = 6{,}35\,K\Omega$

$I_0 - I_1 = \frac{E}{R_{eq}} = \frac{100}{6{,}35\cdot10^3} = 15{,}75\,mA$; $V_1 = R_1 I_1 = 1\cdot10^3 \cdot 15{,}75\cdot10^{-3} = 15{,}75\,V$; $V_{10} = R_{10} I_1 = 2{,}2\cdot10^3 \cdot 15{,}75\cdot10^{-3} = 34{,}65\,V$

$V_{29} = V_2 = V_{39} = R_{29} I_1 = 3{,}15\cdot10^3 \cdot 15{,}75\cdot10^{-3} = 49{,}61\,V$; $I_2 = \frac{V_2}{R_2} = \frac{49{,}61}{4{,}7\cdot10^3} = 10{,}55\,mA$;

$I_3 = \frac{V_{39}}{R_{39}} = \frac{49{,}61}{9{,}57\cdot10^3} = 5{,}18\,mA$; $V_3 = R_3 I_3 = 3{,}9\cdot10^3 \cdot 5{,}18\cdot10^{-3} = 20{,}2\,V$;

$V_{48} = V_{45} = V_6 = V_{78} = R_{48} I_3 = 0{,}97\cdot10^3 \cdot 5{,}18\cdot10^{-3} = 5{,}02\,V$; $V_9 = R_9 I_3 = 4{,}7\cdot10^3 \cdot 5{,}18\cdot10^{-3} = 24{,}35\,V$

$I_4 = \frac{V_{45}}{R_{45}} = \frac{5{,}02}{4{,}3\cdot10^3} = 1{,}17\,mA$; $I_6 = \frac{V_6}{R_6} = \frac{5{,}02}{1{,}5\cdot10^3} = 3{,}35\,mA$; $I_7 = \frac{V_{78}}{R_{78}} = \frac{5{,}02}{7{,}8\cdot10^3} = 0{,}64\,mA$

$V_4 = R_4 I_4 = 3{,}3\cdot10^3 \cdot 1{,}17\cdot10^{-3} = 3{,}86\,V$; $V_5 = R_5 I_4 = 1\cdot10^3 \cdot 1{,}17\cdot10^{-3} = 1{,}17\,V$;

$V_7 = R_7 I_7 = 6{,}8\cdot10^3 \cdot 0{,}64\cdot10^{-3} = 4{,}35\,V$; $V_8 = R_8 I_7 = 1\cdot10^3 \cdot 0{,}64\cdot10^{-3} = 0{,}64\,V$

Riassumendo

$I_1 = 15{,}75\,mA$; $I_2 = 10{,}55\,mA$; $I_3 = 5{,}18\,mA$; $I_4 = 1{,}17\,mA$; $I_6 = 3{,}35\,mA$; $I_7 = 0{,}64\,mA$

$V_1 = 15{,}75\,V$; $V_2 = 49{,}61\,V$; $V_3 = 20{,}2\,V$; $V_4 = 3{,}86\,V$; $V_5 = 1{,}17\,V$; $V_6 = 5{,}02\,V$; $V_7 = 4{,}35\,V$

$V_8 = 0{,}64\,V$

3. - $P = E \cdot I_1 = 100 \cdot 15{,}75\cdot10^{-3} = 1{,}575\,W$

4. - $P_{45} = P_4 + P_6 = V_4 I_4 + V_6 I_6 = 3{,}86\cdot1{,}17\cdot10^{-3} + 5{,}02\cdot3{,}35\cdot10^{-3} = 21{,}33\,mW$