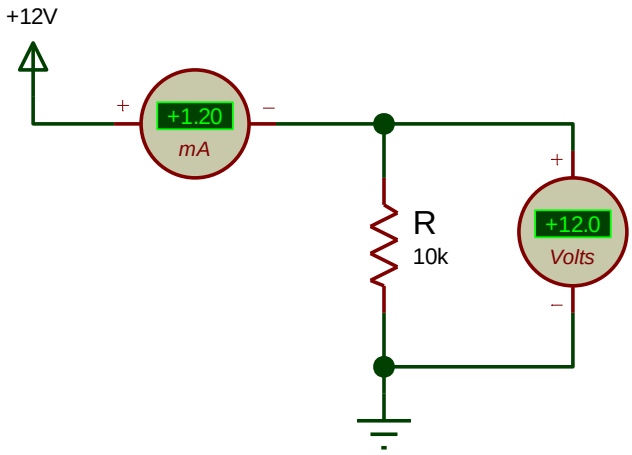
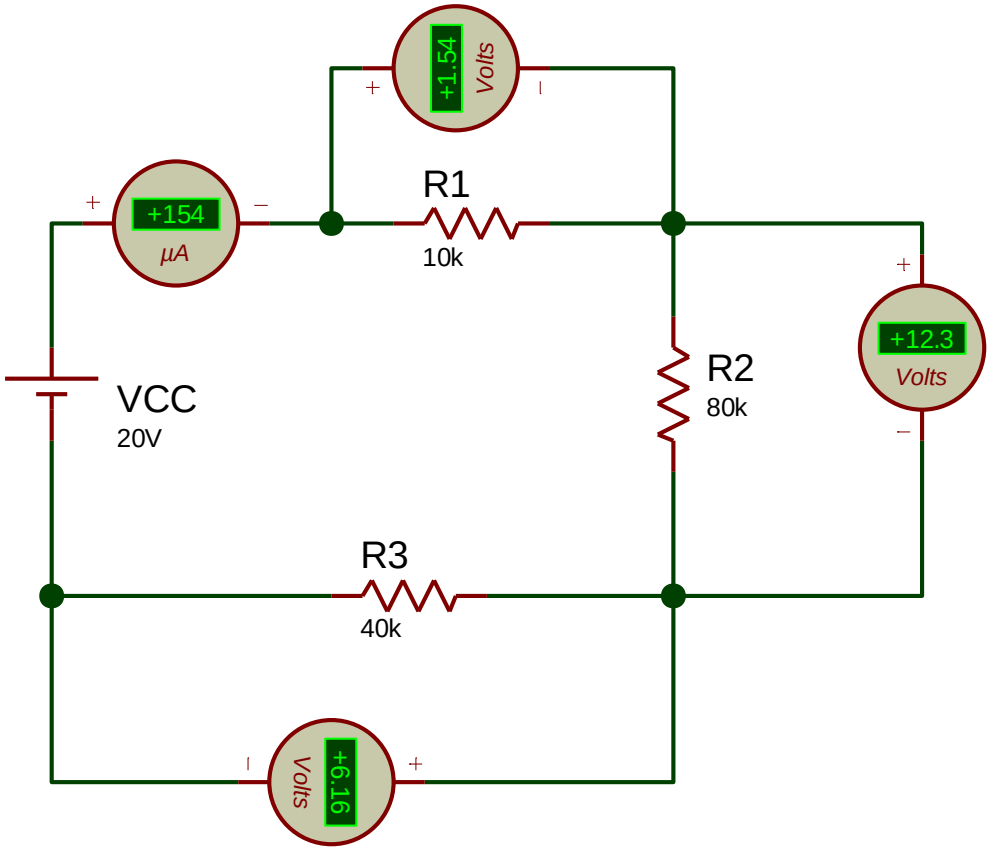
CIRCUITI ANALOGICI RESISTIVI

1. CIRCUITI SERIE – Legge di Ohm



LEGGE di OHM : V = R * I I = V/ R R = V/ I



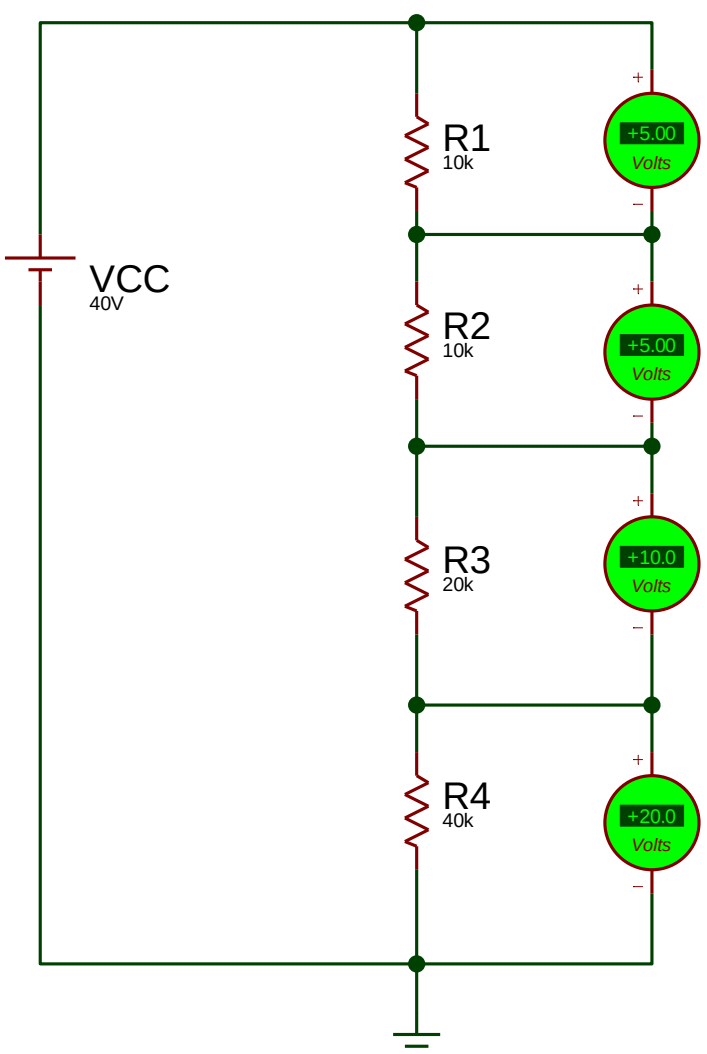
Req = R1 + R2 + R3 = 130 [KOhm]

I = Vcc / Req = 20 / 130 = 0,15 [mA]

VR1 = I * R1 = 1,54 [V] VR2 = I * R2 = 12,3 [V] VR3 = I * R3 = 6,16 [V]

VR1 = Vcc * R1 / Req

2. PARTITORE DI TENSIONE



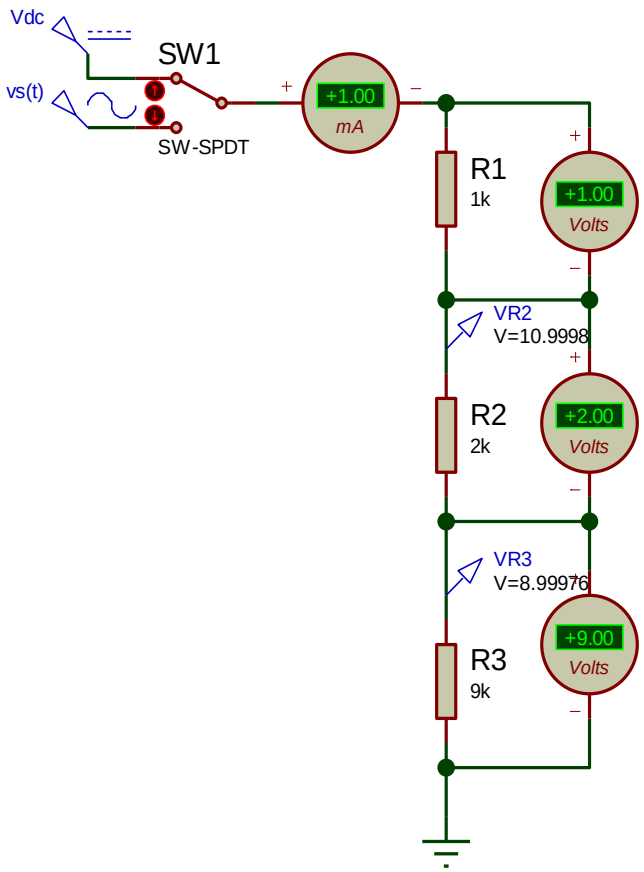
VR1 = 40 * 10 / (40+20+10+10) = 5 [V]

VR2 = 40 * 10 / (40+20+10+10) = 5 [V]

VR3 = 40 * 20 / (40+20+10+10) = 10 [V]

VR4 = 40 * 40 / (40+20+10+10) = 20 [V]

3. PARTITORE DI TENSIONE IN DC E IN REGIME SINUSOIDALE



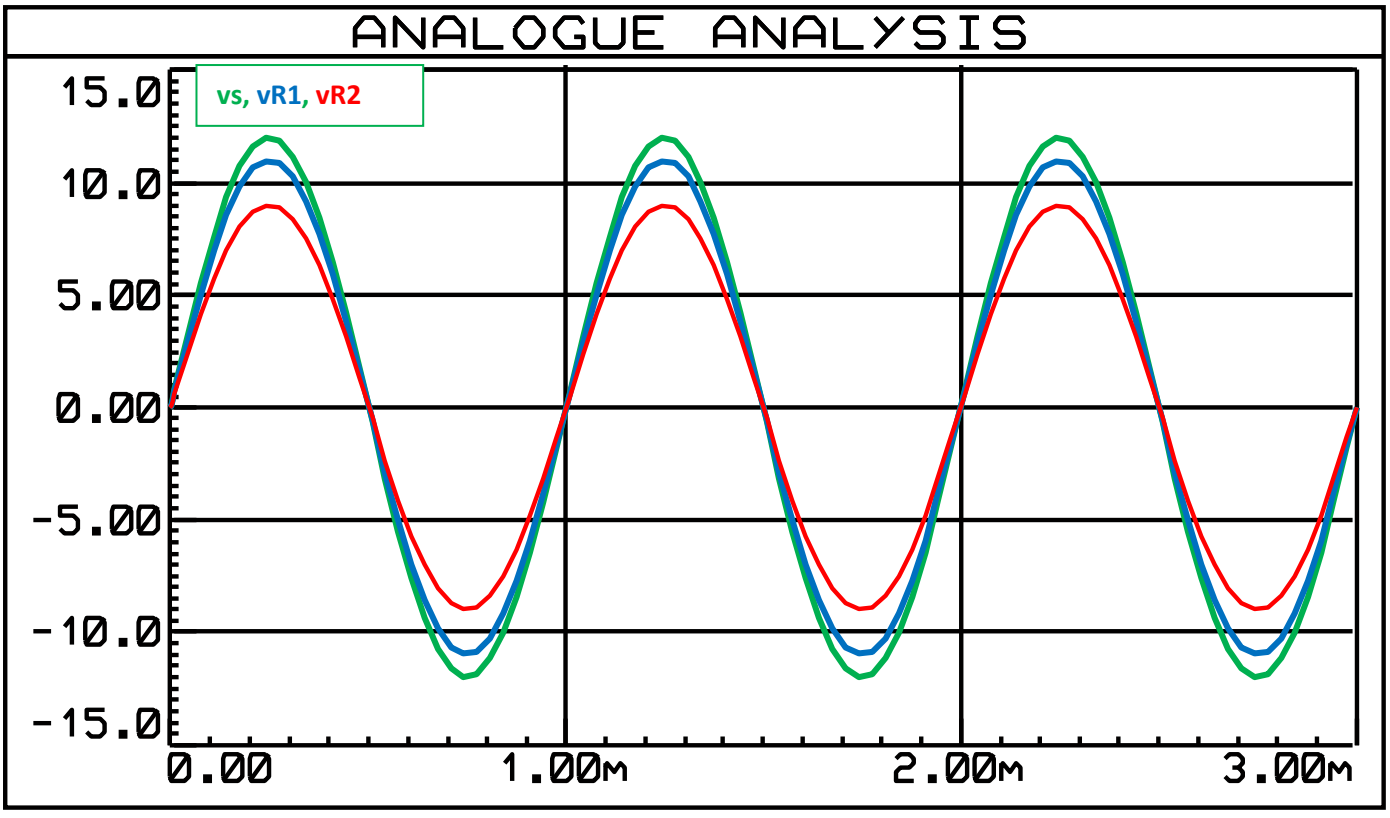
Req = R1 + R2 + R3 = 12 k

VR1 = Vg * R1 / Req = 12 * 1 / 12 = 1 [V]

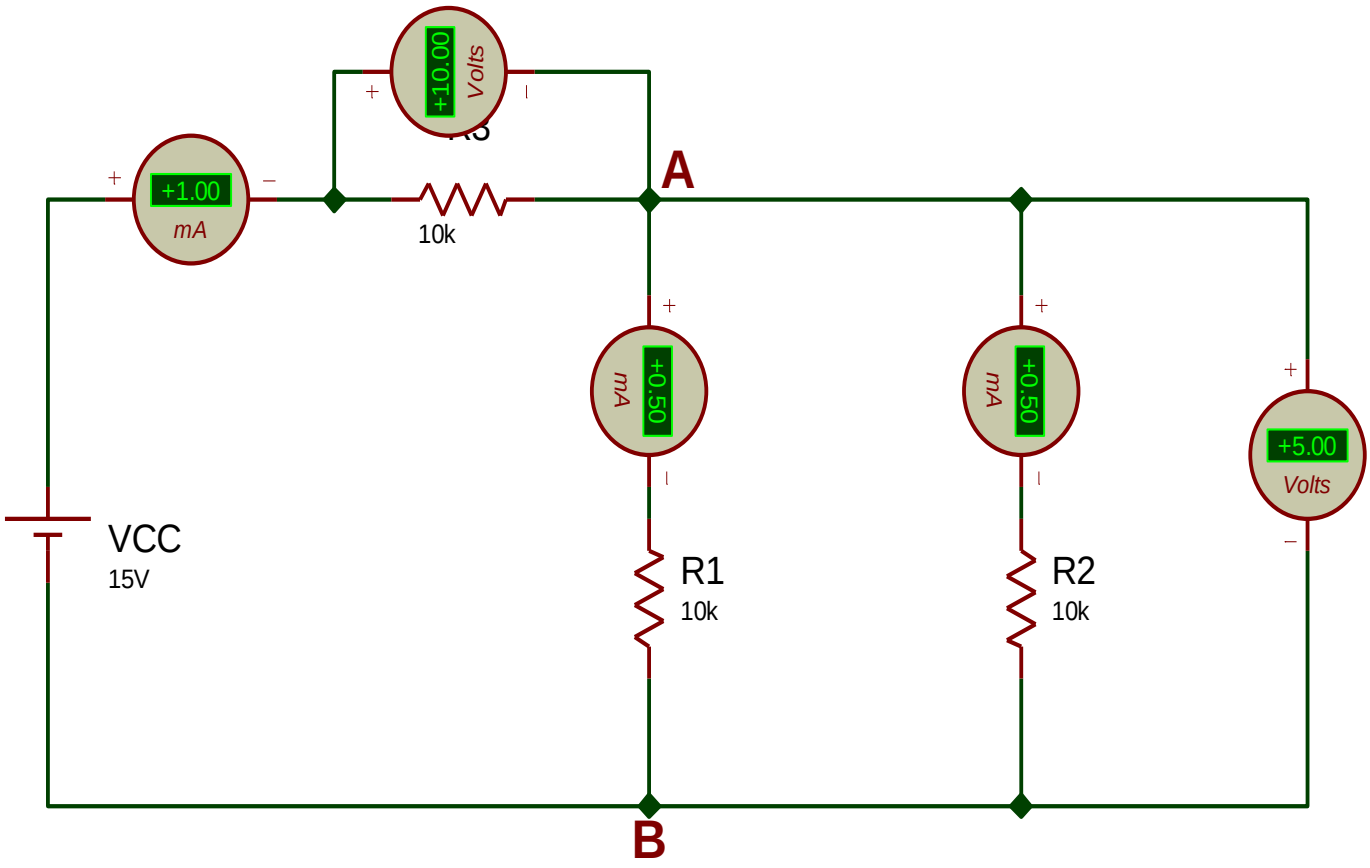
VR2 = Vg * R2 / Req = 12 * 2 / 12 = 2 [V]

VR3 = Vg * R3 / Req = 12 * 9 / 12 = 9 [V]

Ig = Vg / Req = 12 / 12 = 1 [mA]



4. CIRCUITO SERIE – PARALLELO 1

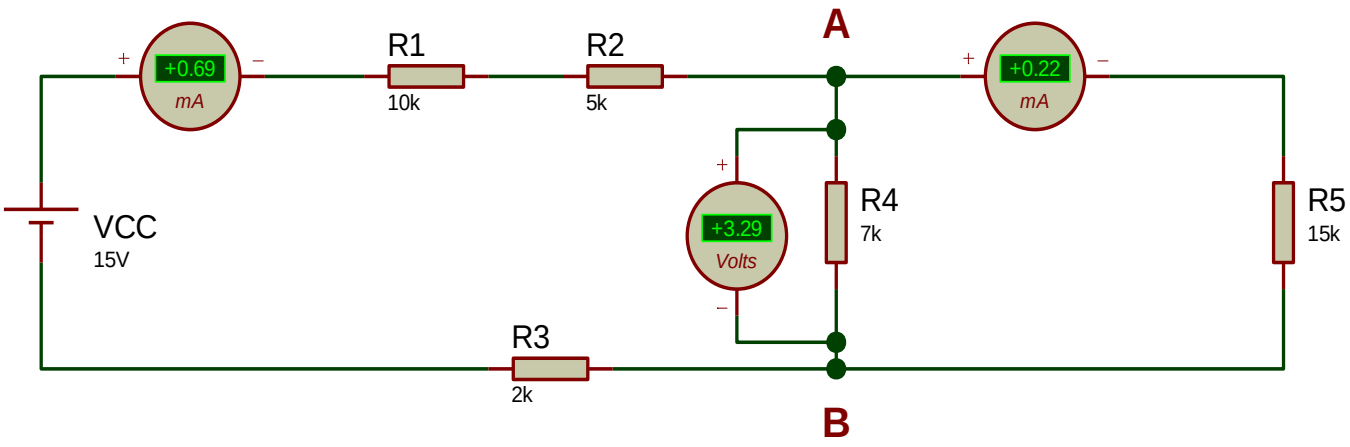


Req = R3 + (R1 // R2) = R3 + Rp = 10 + (10 // 10) = 15 [KOhm]

VAB = Vcc * RAB/ Req = Vcc * (R1 // R2) / [R3 + (R1 // R2)] = 15 * 5 / 15 = 5 [V]

Icc = Vcc / Req = 15 / 15 = 1 [mA] **IR1 = IR2 = Icc /2 = 0,5 [mA]**

4. CIRCUITO SERIE – PARALLELO 2



Req=10+5+(7//15)+2=10+5+4.8+2=21.8k

Icc= Vcc/Req= 15/21.8= 0.69 [mA]

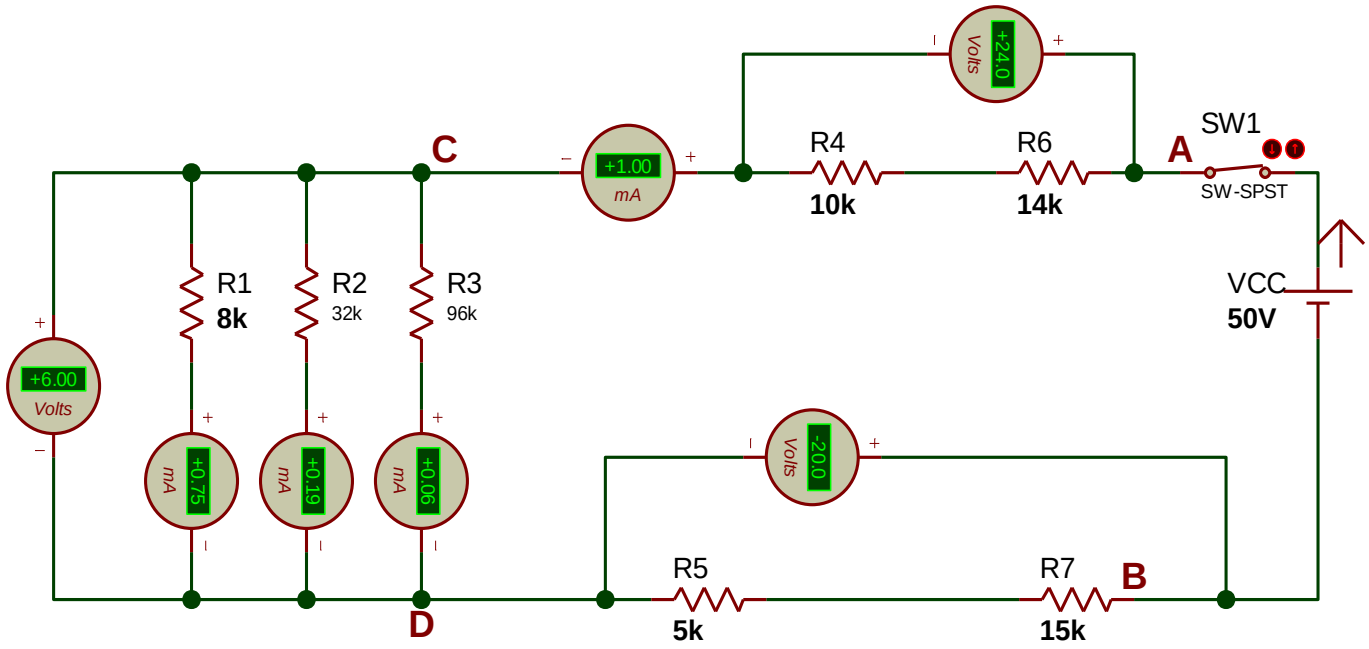
Vab= Icc*Rp1= 0.69*4.8= 3.31 [V]

Vab= Vcc* Rp1/Req= 15* 4.8/21.8= 3.30 [V]

Ir4= Vab/R4= 3.31/7= 0.47 [mA]

Ir5= Icc-Ir4= 0.69-0.47= 0.22 [mA]

5. CIRCUITO SERIE – PARALLELO 3



1) RAB = 14+10+6+5+15 = 50 K

2) Icc = Vcc / Req = 50 / 50 = 1 [mA]

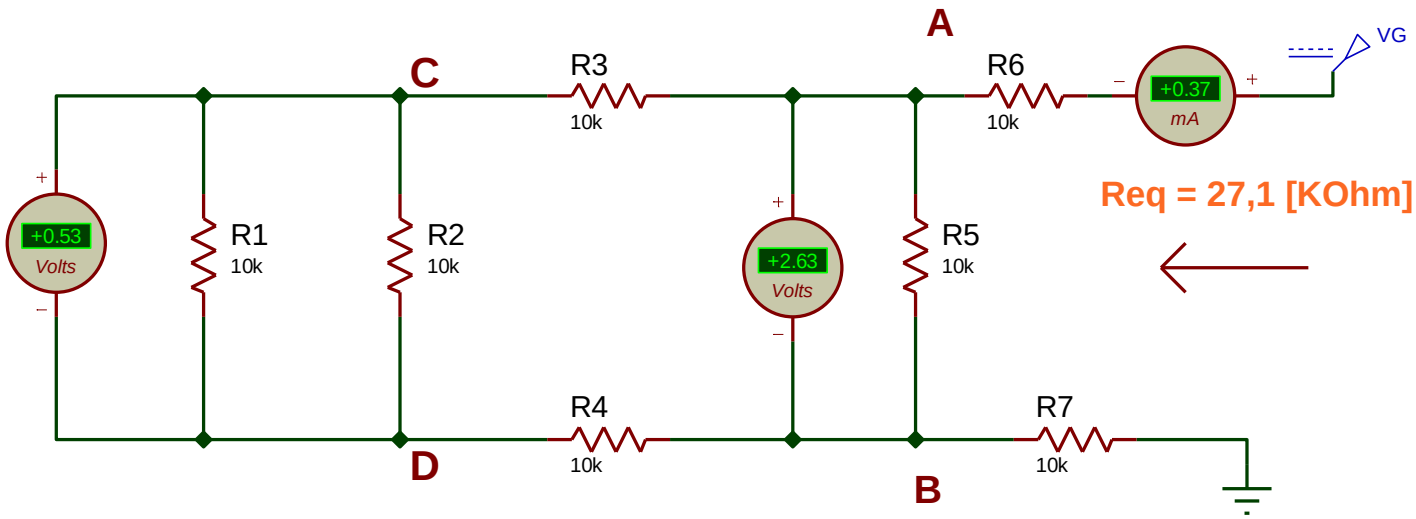
3) VCD = Icc * RP = 1 * 6 = 6 [V]

4) IR1 = VCD /R1 = 6 / 8 = 0,75 [mA] IR2 = 6/32 = 0,1875 [mA] IR3 = 6/96 = 0,0625 [mA]

5) VCD = Vcc * RP / REQ = 50* 6/ 50 = 6 [V]

6) VCD = Vcc - (R4+R5+R6+R7) * Icc = 50 - 44 * 1 = 6 [V]

6. CIRCUITO SERIE – PARALLELO 4



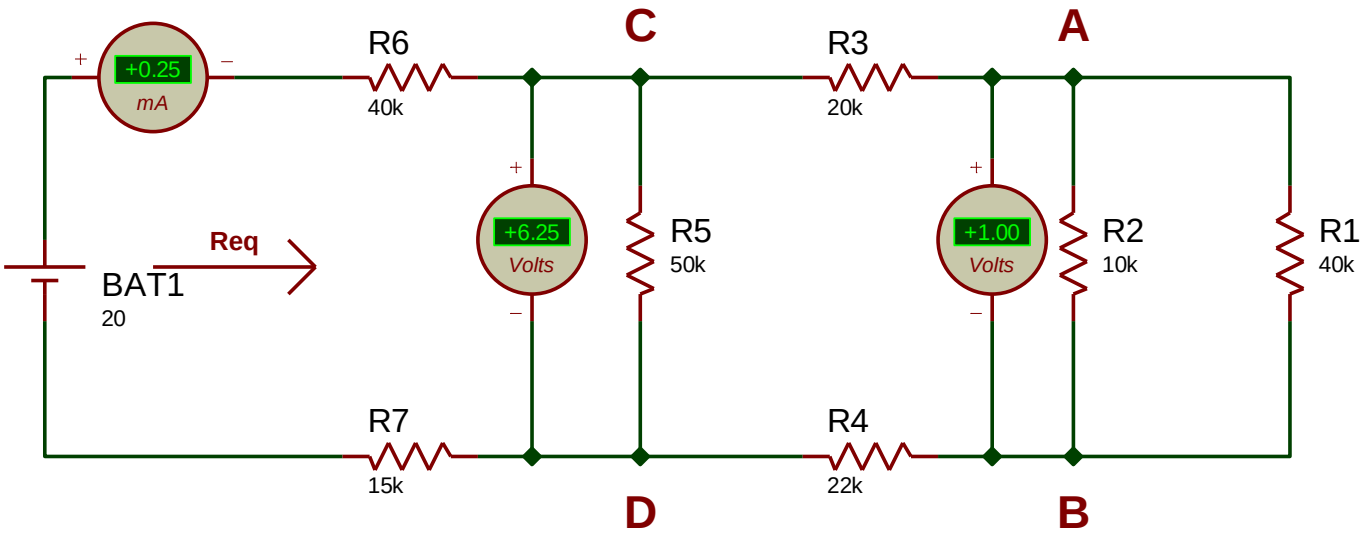
Req = [(R1//R2 + R3 +R4) // R5] + R6 + R7 = [(5 +10 +10) // 10] +10 +10 = 27,1 [KOhm]

R_{AB} = (10//10 +10+10) // 10 = 25//10 = 7,14 K

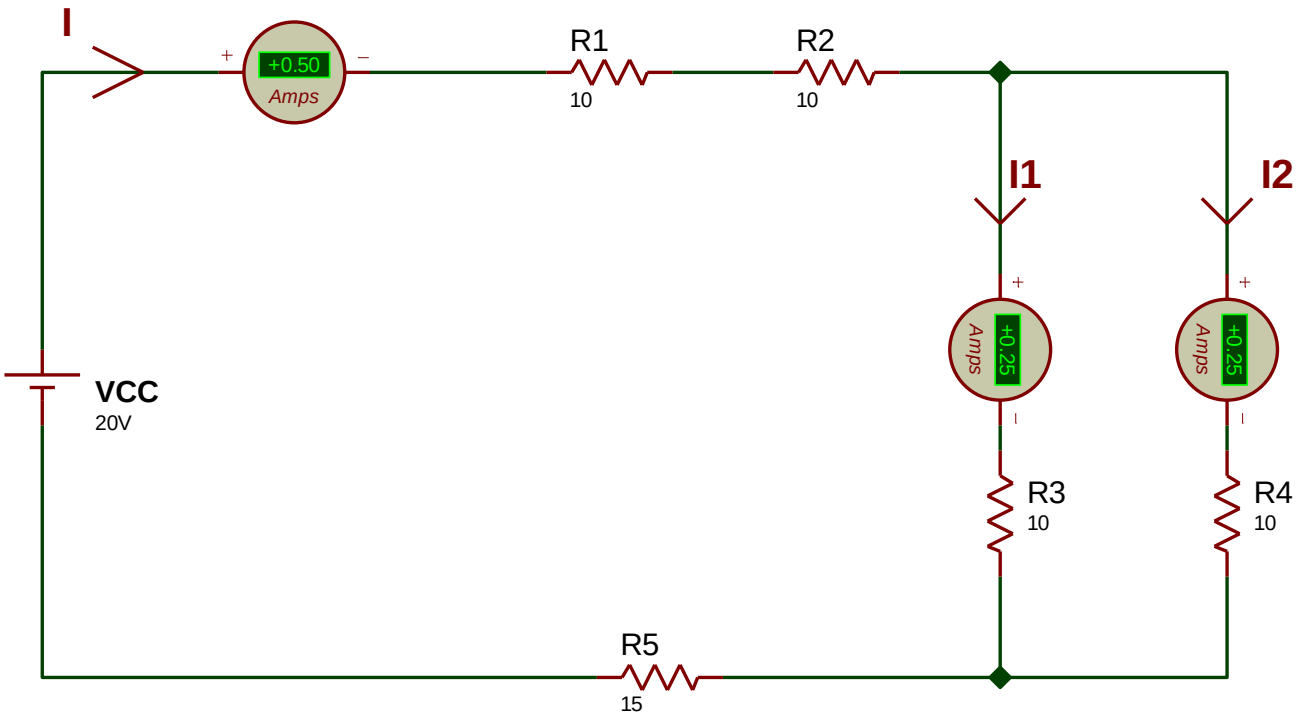
V_{AB} = Vg * R_{AB} / Req = 10* 7,14/27,1 = 2,63 [V]

$V_{CD}(t)$ = 2,63 * 5 / 25 = 0,53 [V]

7. CIRCUITO SERIE – PARALLELO 5



8. CIRCUITO SERIE – PARALLELO 6

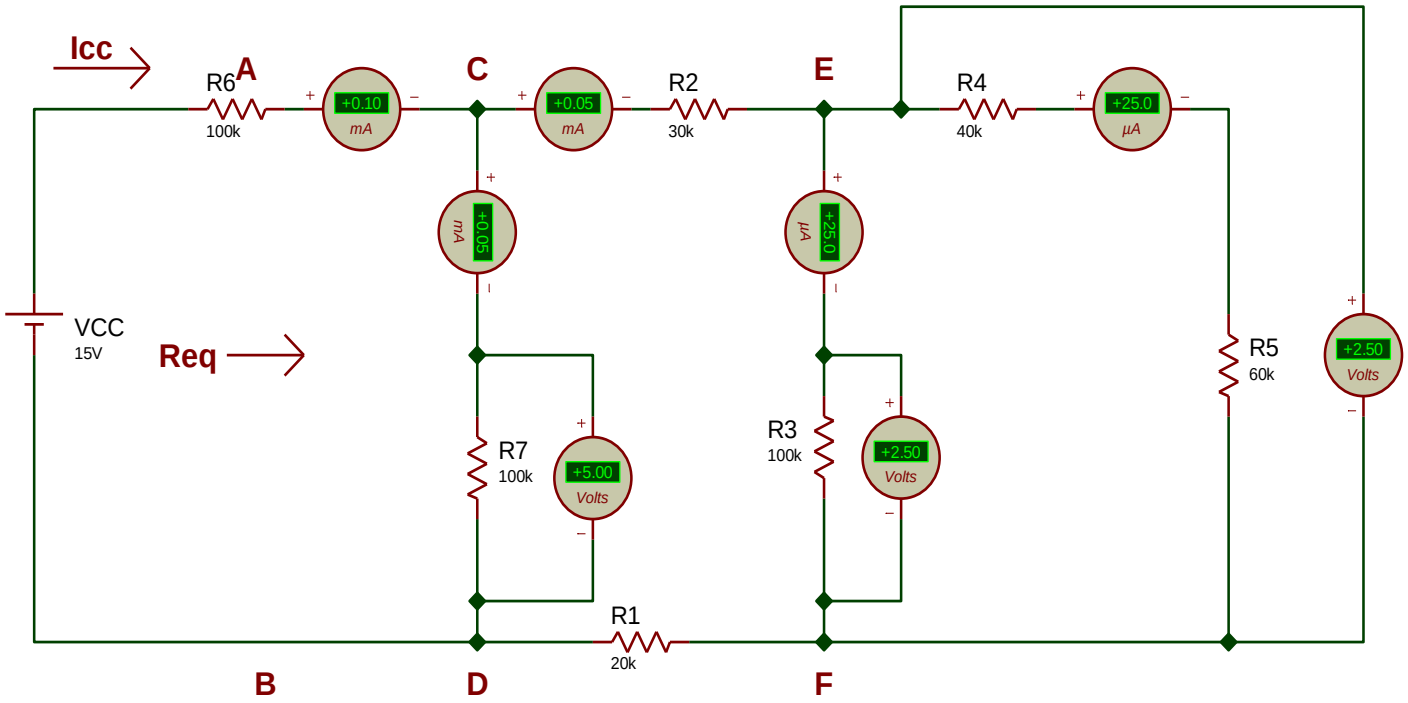


Req = 10+10+ [10*10 / (10+10)] + 15 = 40 [Ohm]

I = Vcc / Req = 20 / 40 = 0.5 [A]

I1 = I2 = Icc /2 = 0,25 [mA]

9. CIRCUITO SERIE – PARALLELO 7

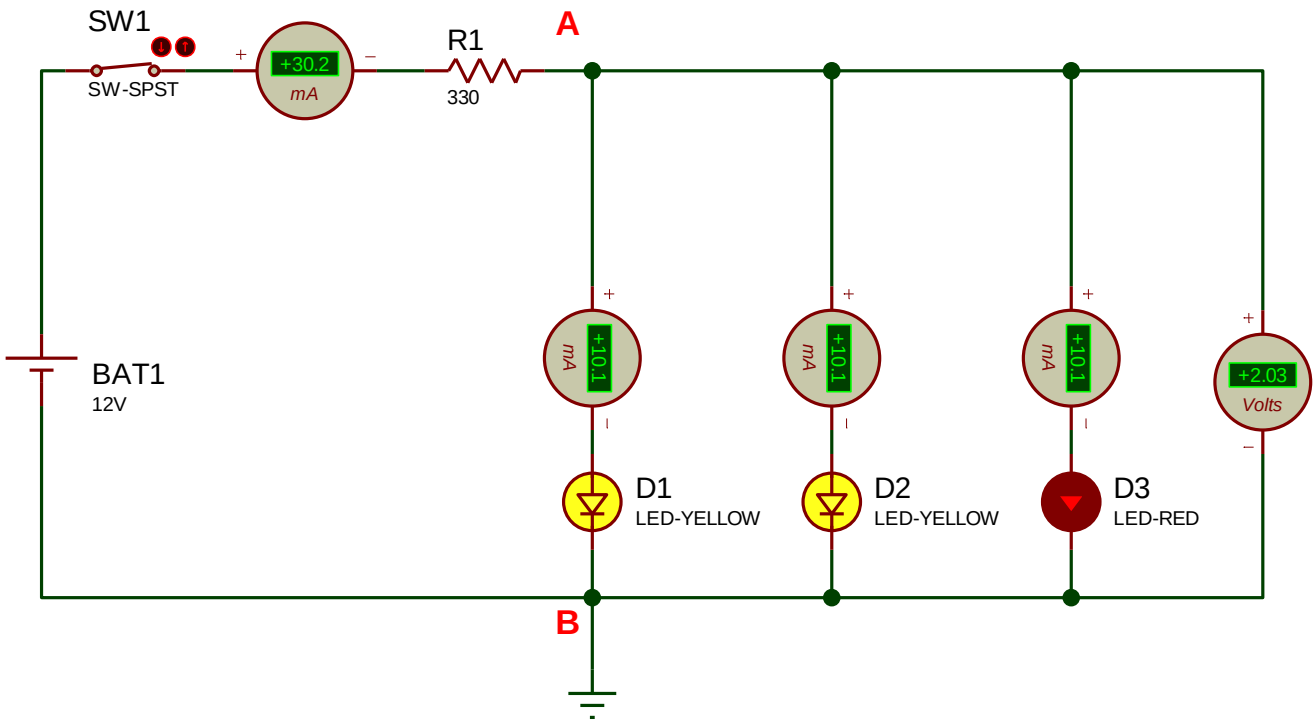


Req = 150 [Ohm] **Rcd = 50 [Ohm]** **Ref = 50 [Ohm]**

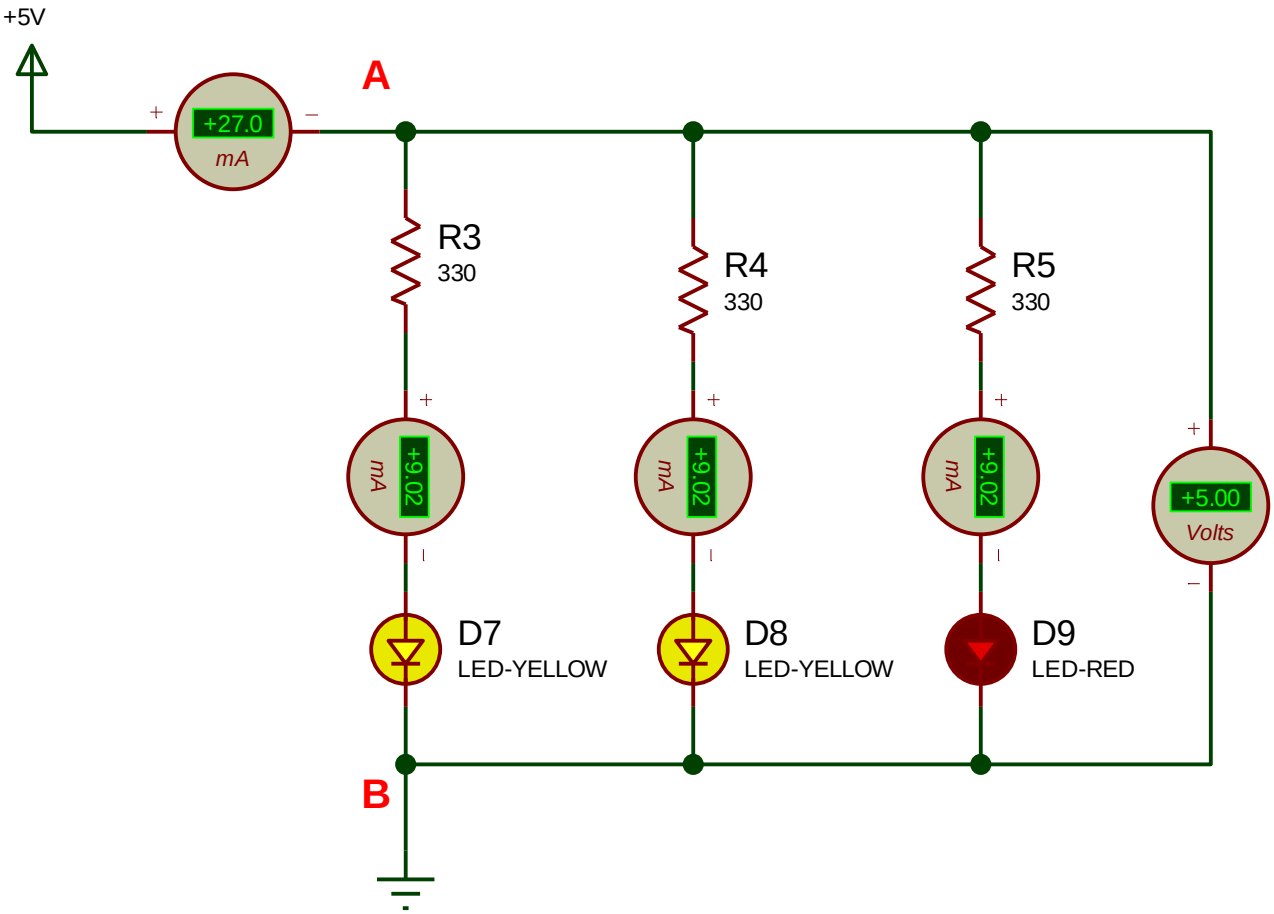
Vcd = Vcc * Rcd / Req = 15 * 50 / 150 = 5 [V] **Vef = 5 * 50 / 100 = 2,5 [V]**

10. ACCENSIONE 3 LED IN PARALLELO

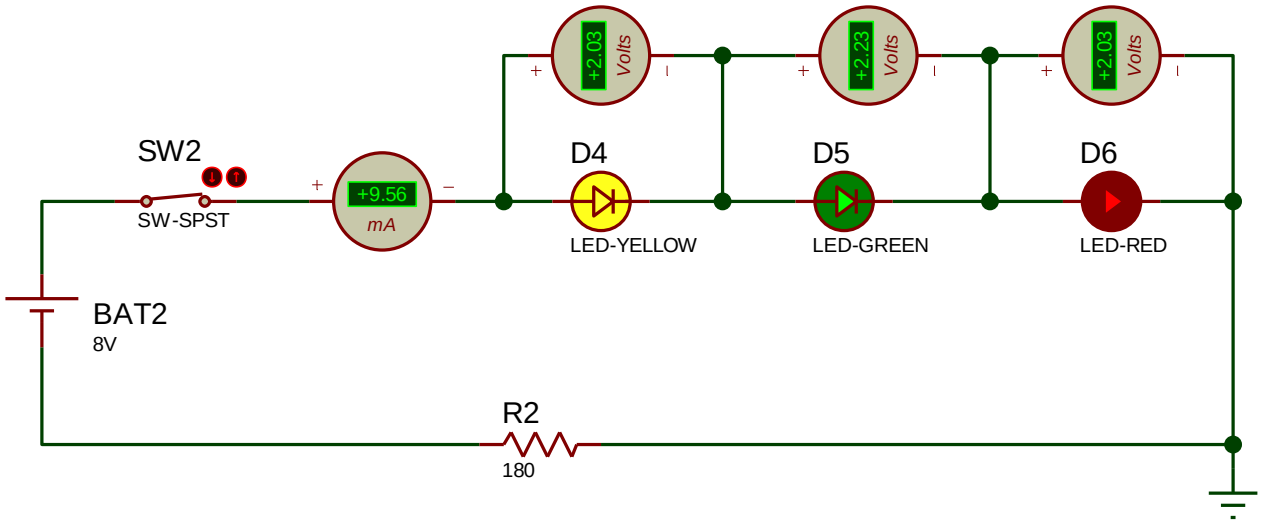
a)



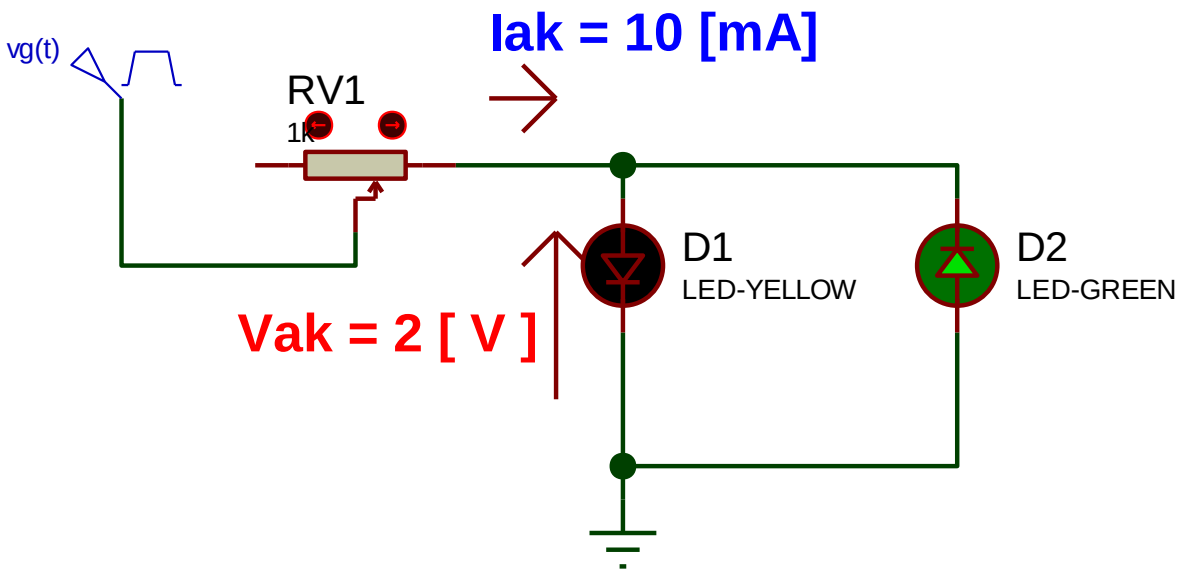
b)



11. ACCENSIONE 3 LED IN SERIE



12. ACCENSIONE 2 LED IN CONTROFASE , CON ONDA QUADRA



R = VR/Iak = (Vg - Vak)/Iak = (5 - 2)/10 = 3/10 = 0,3 K >>> 330 [Ohm]