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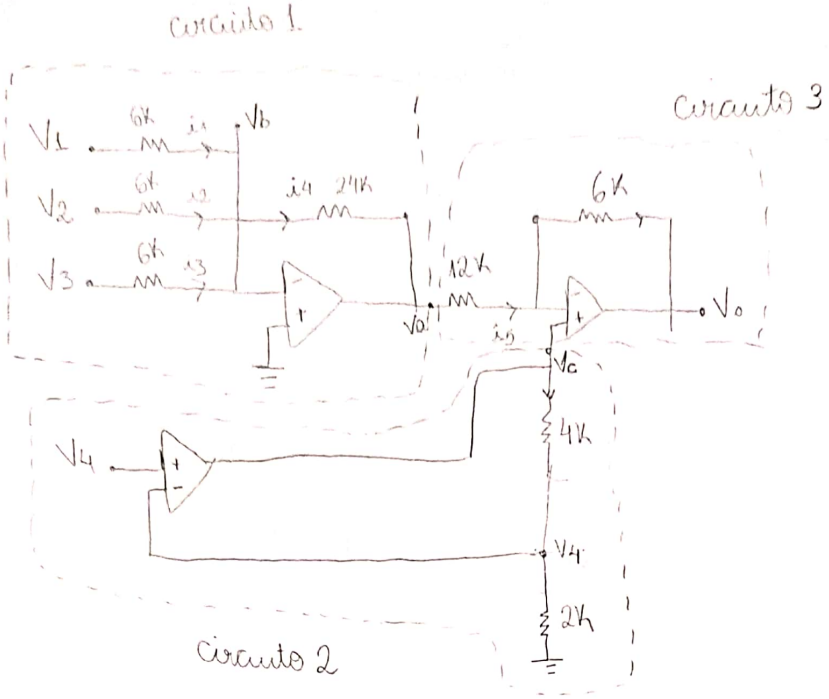
P3 - Eletrônica B

2)



circuito 1:

$$\frac{V1-0}{6K}+\frac{V2-0}{6K}+\frac{V3-0}{6K}-\frac{0-Va}{24K}=0$$

$$\frac{V1}{6K}+\frac{V2}{6K}+\frac{V3}{6K}=\frac{-Va}{24K}$$

$$\frac{-24K}{6K}(V1+V2+V3)=Va \rightarrow \boxed{-4(V1+V2+V3)=Va}$$

circuito 2

$$\frac{V4-Vc}{4K}+\frac{V4}{2K}=0$$

$$\frac{V4}{4K}+\frac{V4}{2K_{.2}}=\frac{Vc}{4K}$$

$$\frac{V4}{4K}+\frac{2V4}{4K}=\frac{Vc}{4K} \rightarrow \boxed{Vc=3V4}$$

circuito 3

$$\frac{Va-Vc}{12K}-\frac{Vc-Vo}{6K}=0$$

$$\frac{Va-Vc}{12K}=\frac{Vc-Vo}{6K}$$

$$\frac{6K}{12K}(Va-Vc)=Vc-Vo$$

$$\frac{1}{2}(Va-Vc)-Vc=-Vo$$

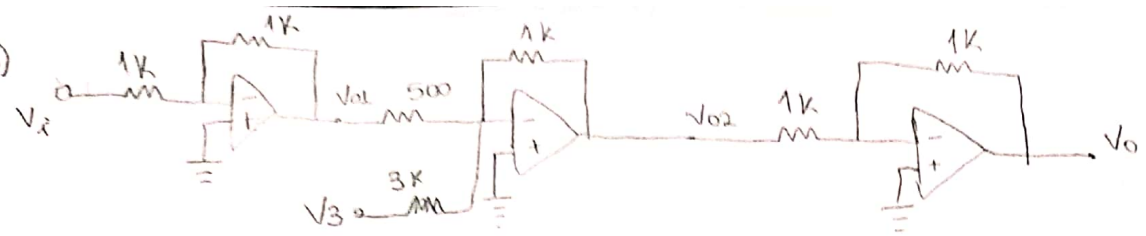
$$\frac{Va}{2}-\frac{Vc}{2}-\frac{Vc}{2}=-Vo$$

$$2Vo=3Vc-Va$$

$$2Vo=9V4+4(V1+V2+V3)$$

$$\boxed{Vo=2V1+2V2+2V3+4,5V4}$$

3-a)



$$\frac{V_1}{1K} = \frac{-V_{o1}}{1K}$$

$$V_{o1} = -V_1$$

$$\frac{V_{o1}}{0,5K} + \frac{V_3}{3K} = -\frac{V_{o2}}{1K}$$

$$2V_{o1} + \frac{V_3}{3} = -V_{o2}$$

$$V_{o2} = -2V_{o1} + \frac{V_3}{3}$$

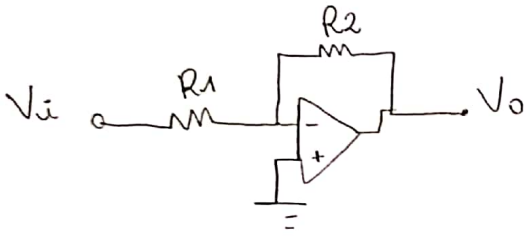
$$V_{o2} = 2 \cdot V_1 - \frac{V_3}{3}$$

$$\frac{V_{o2}}{1K} = \frac{-V_o}{1K}$$

$$V_o = -V_{o2}$$

$$\boxed{V_o = -2V_1 + \frac{V_3}{3}}$$

b)



$$\frac{V_1}{R_1} = \frac{-V_o}{R_2}$$

$R_1 = 11K$

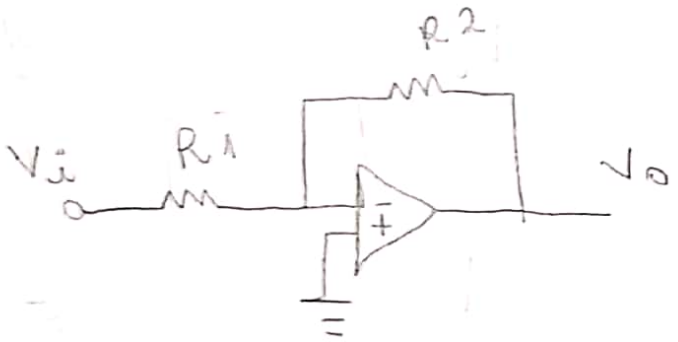
$R_2 = 12K$

$$V_o = -\frac{R_2}{R_1} \cdot V_i$$

$$V_o = -\frac{12K}{11K} \cdot V_i$$

$$\boxed{V_o = -\frac{12}{11} \cdot V_i}$$

c)



se Vi = -15, temos:

$$\frac{Vi}{R1} = \frac{-Vo}{R2}$$

$$Vo = -V1\frac{R2}{R1}$$

$$9,6 = -(-15)\frac{R2}{R1} \Rightarrow \frac{R2}{R1} = 0,64$$

$R2 = 0,64 \cdot R1$

$R1 = 10K$

$R2 = 6,4K$

comitiva:

Vi = -15 , Vo = 9,6V