solution second Exam.

Q1 find f_T «unity Bandwidth».

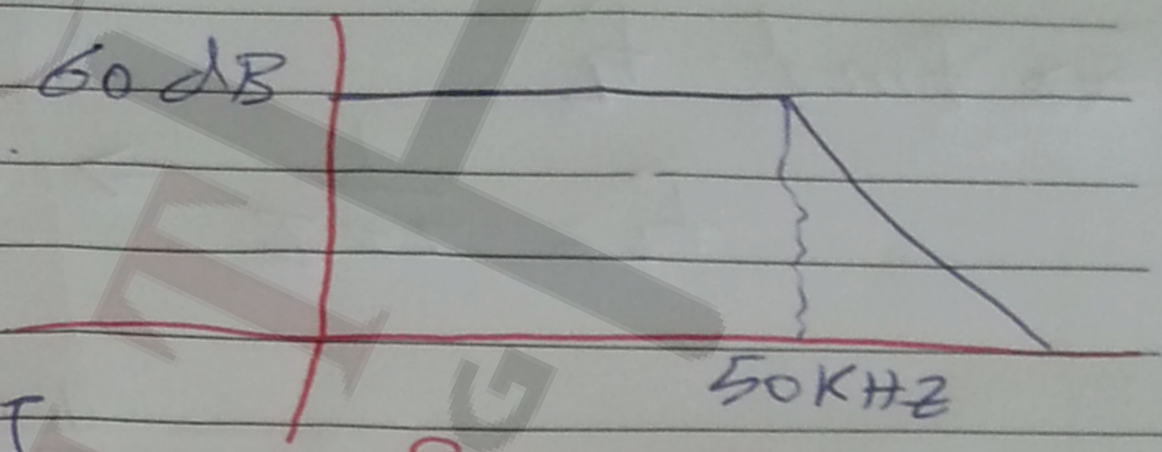


figure (1)

$60\ dB = 20\log_{10}(B)$

$\Rightarrow B = 10^3$

$f_T = B f_B = 10^3 \times 50KHz = 50MHz$ ✱

Q2 $T(s) = K\frac{1}{1+s\tau}$

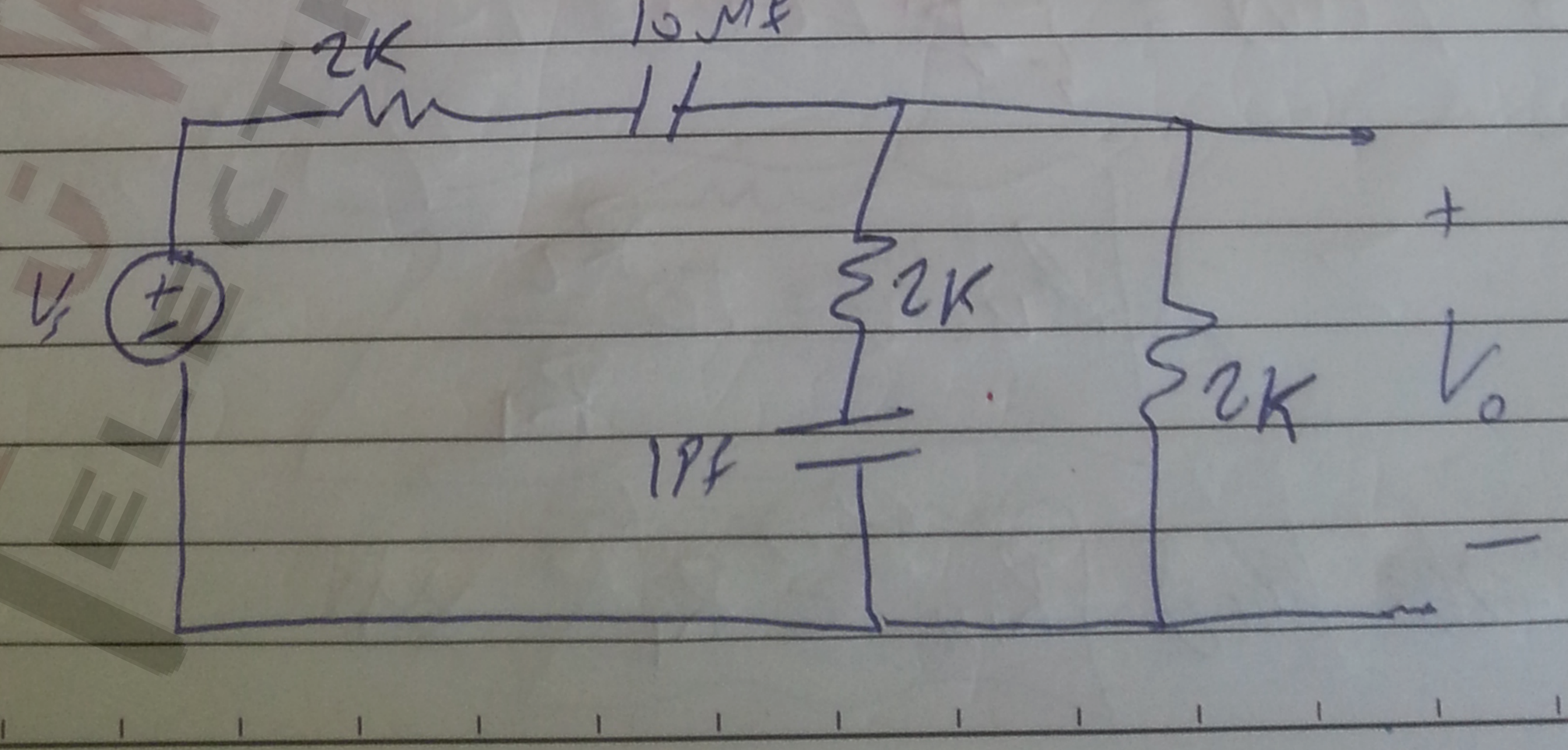
In figure (1) find The Transfer function

$\Rightarrow \frac{10^3}{1+J2\pi f\tau} = \frac{10^3}{1+J\frac{f}{f_{3dB}}} = \frac{10^3}{1+J\frac{f}{5\times10^4}}$

Q3 if $B = 20\ dB \Rightarrow f_T = ??$

$f_T = B f_B = const. = 50\ MHz$

Q4



Anas Kats

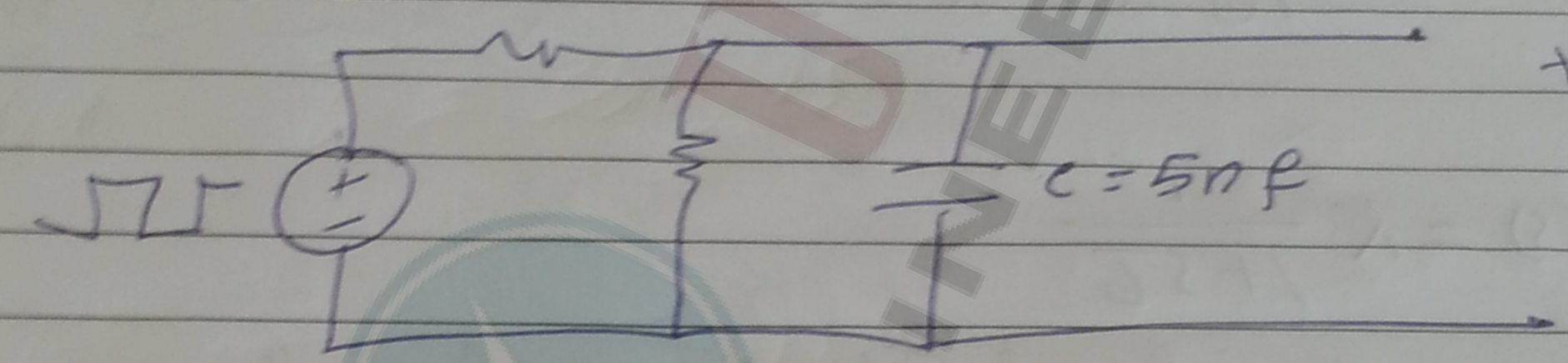
→ find f_L

$$f_L = \frac{1}{2\pi\tau} \Rightarrow \tau = R_{th} C$$

$$= 10 \times 10^{-6} (2+2) \times 10^{3}$$

$$\Rightarrow f_L = \frac{100}{8\pi} \text{ Hz}$$

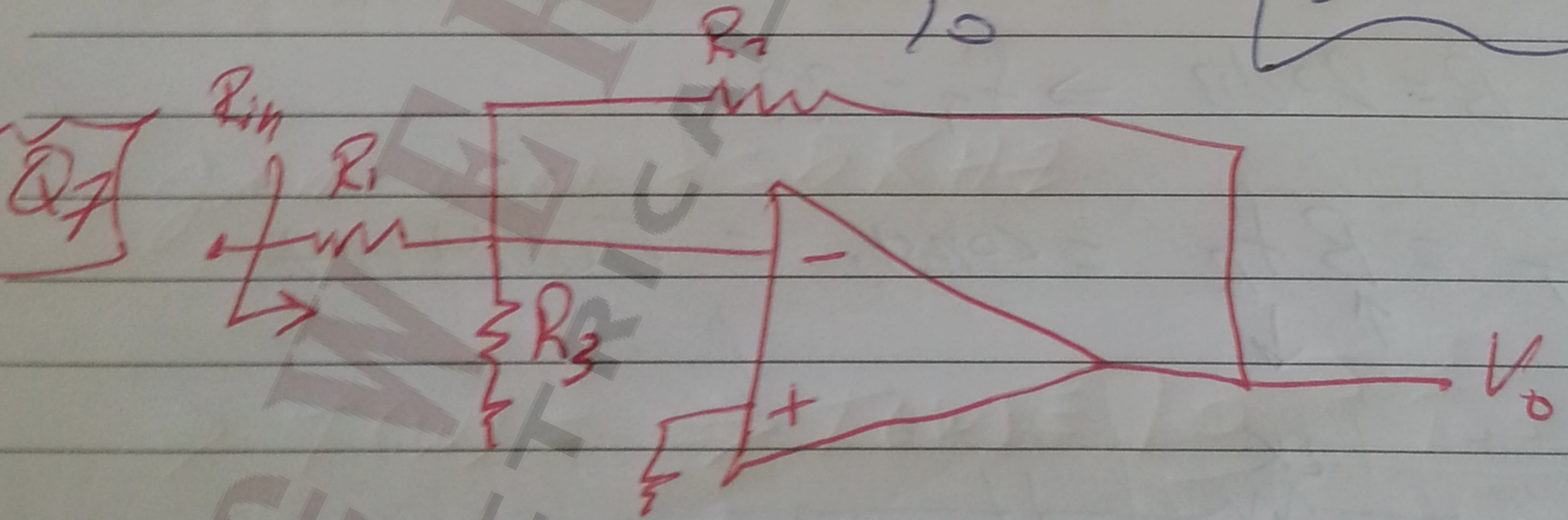
Q6] $V_o = ?? V_i$



$f_s = ??$

$$T \leq \frac{T}{10}$$

$$2K * 5 \times 10^{-9} \leq \frac{1}{2} \times \frac{1}{f} \Rightarrow \boxed{f_s \leq 5 \text{ kHz}}$$

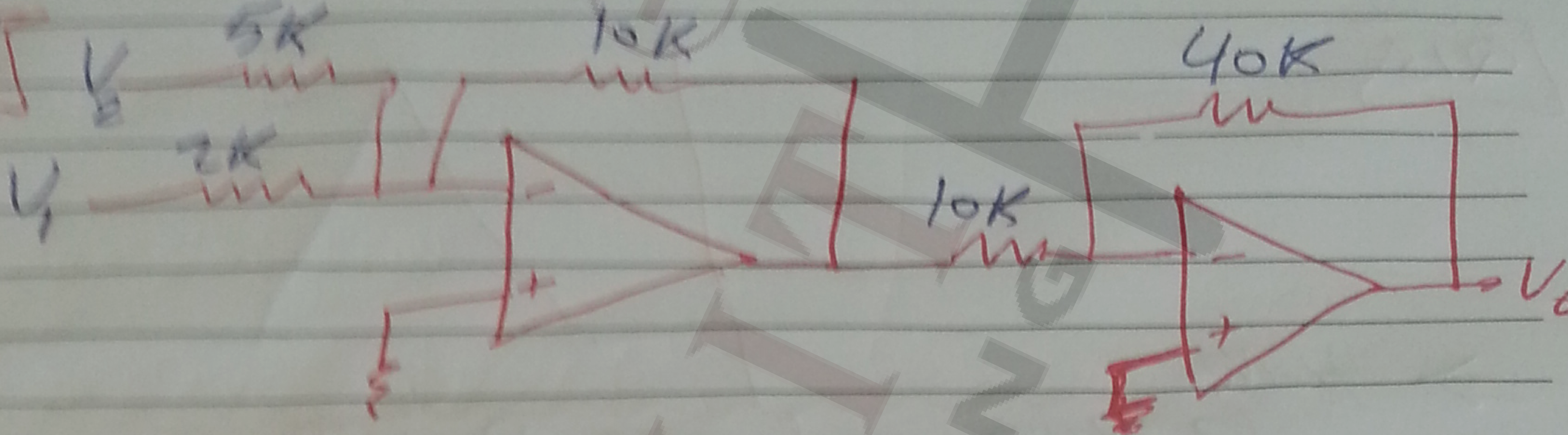


$$\boxed{A_v = -\frac{R_2}{R_1}} \quad **$$

Q8] and $\boxed{R_{in} = R_1}$ **

Anas Kats

Q9

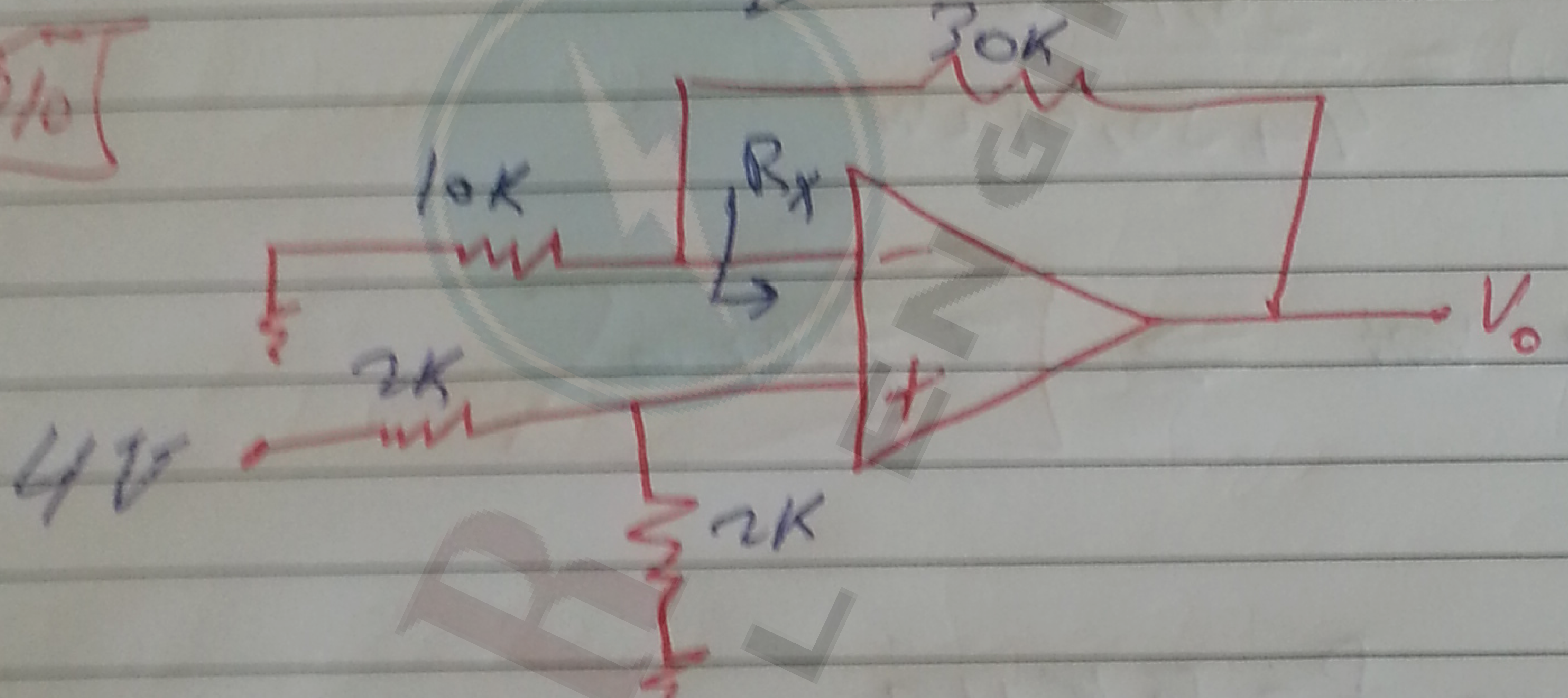


$V_{out} = -5V_1 - 2V_2$

$V_o = -4(-5V_1 - 2V_2)$

$= 20V_1 + 8V_2$ #

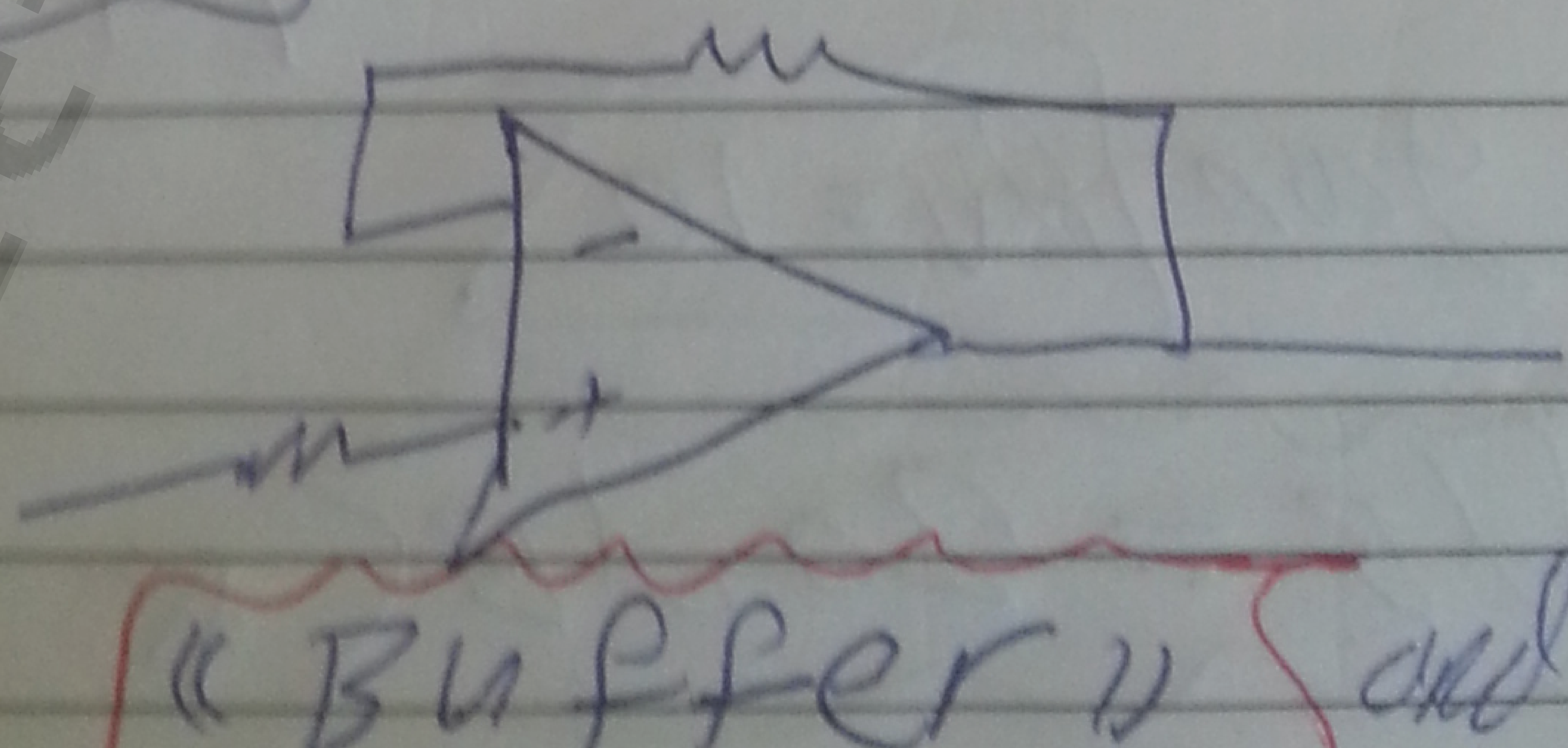
Q10



$V_o = 8V$ #

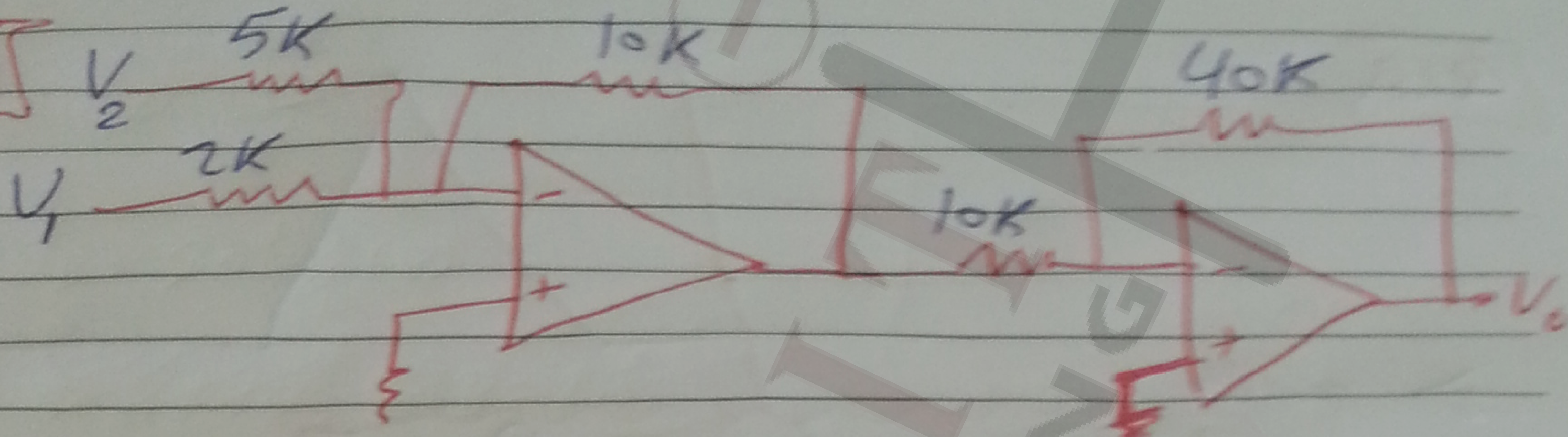
Q11 $R_x = \infty$

Q12



«Buffer» and $AV = 1$

Q9

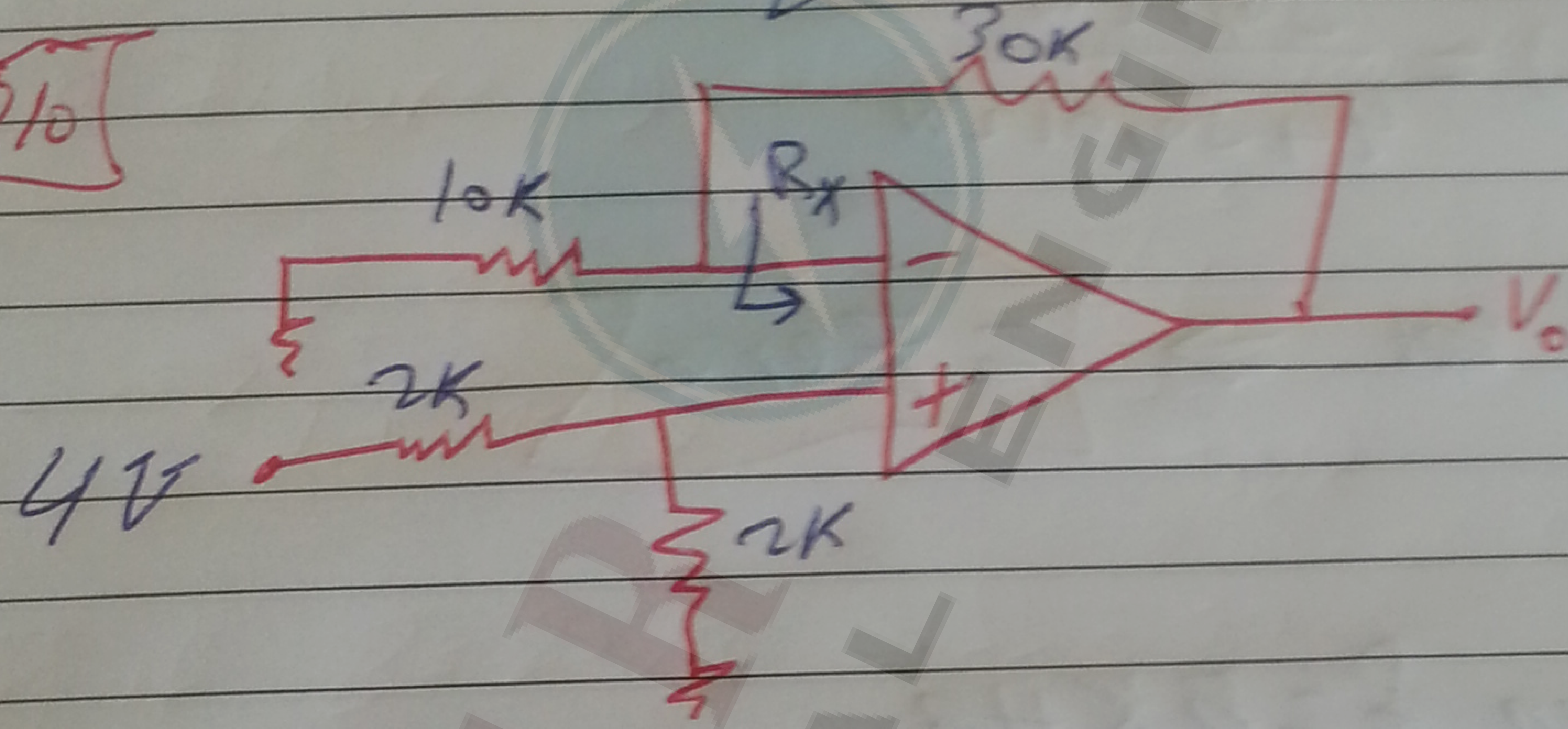


$$V_{out} = -5V_1 - 2V_2$$

$$V_o = -4(-5V_1 - 2V_2)$$

$$= 20V_1 + 8V_2$$ #

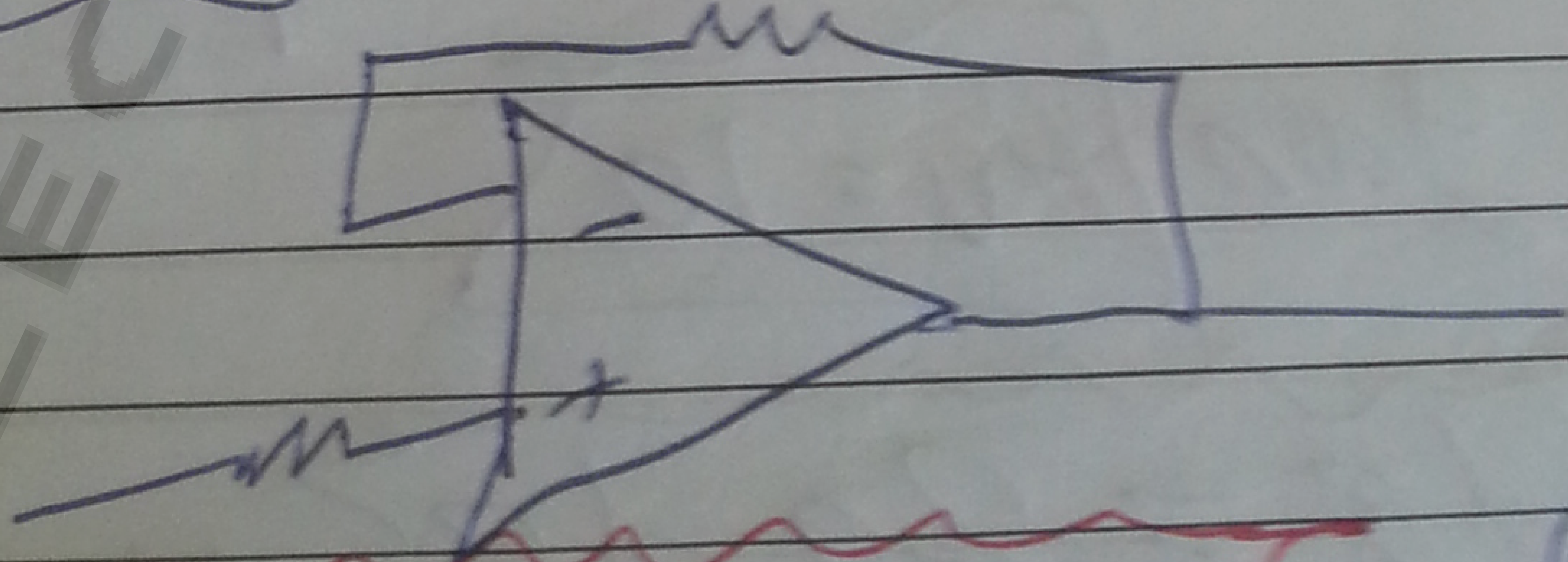
Q10



$$V_o = 8V$$ #

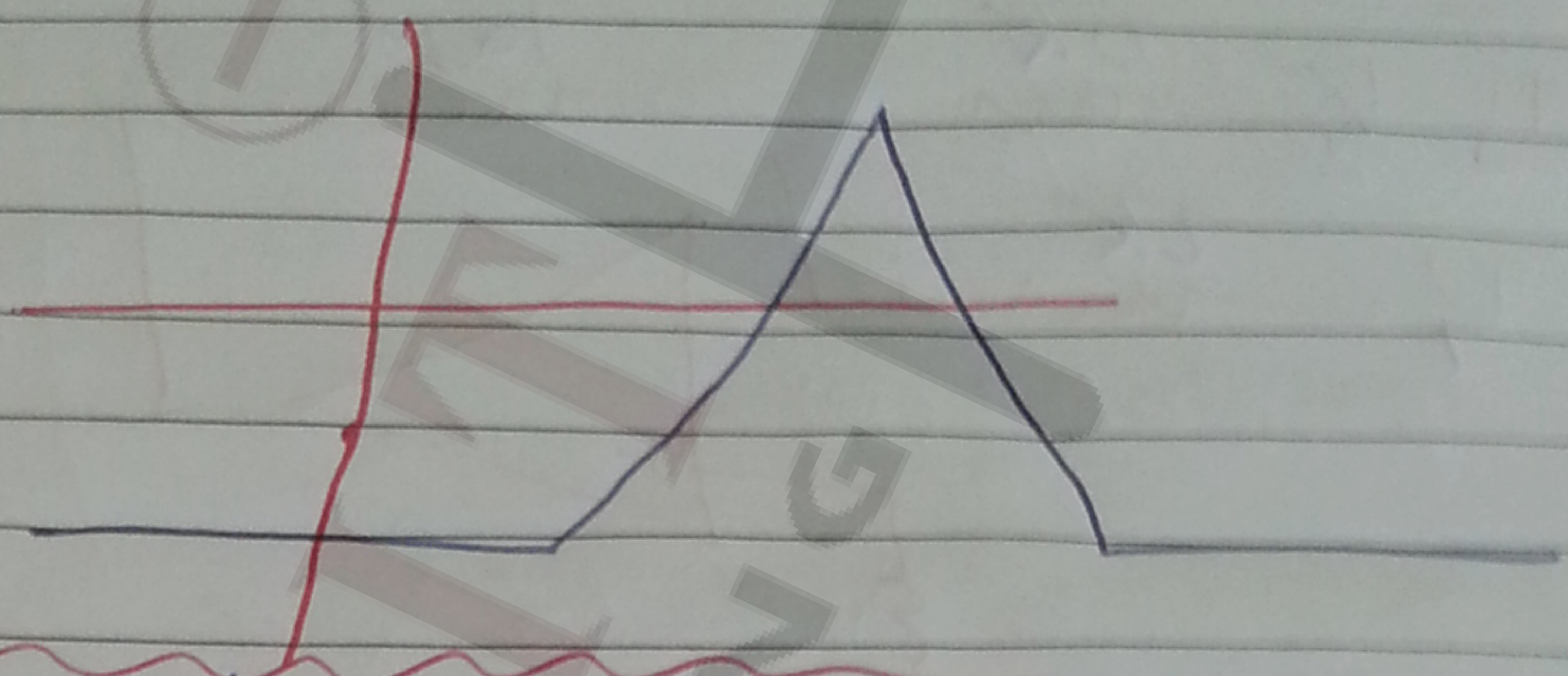
Q11 $R_x = \infty$

12



« Buffer » and $AV = 1$

Q13



⇒ Have

2 Zero and one Pole

Q14 $\tau = 35\ \mu s$

Q15

$$T(\omega) = \frac{j0.12\omega}{4 + j0.012\omega}$$

DC gain ⇒ = Zero

gain when f = 5 KHz

$$\Rightarrow T(\omega) = \Rightarrow T(\omega) = \frac{10\, j\frac{3}{100}}{4 + j\frac{3}{100}}$$

⇒ gain $A_V = 10$

gain in dB = 20 dB #