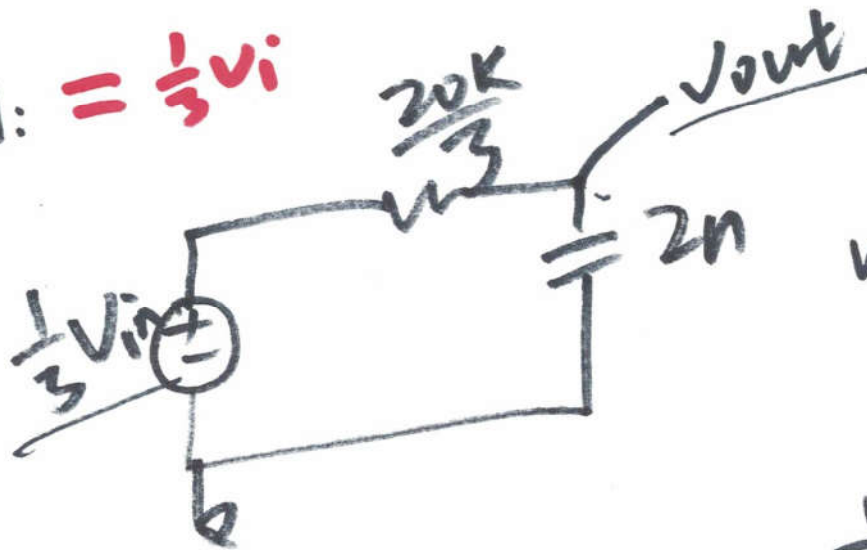


$E_{TH} = \frac{1}{3}v_i$



$$\frac{v_{out}}{\frac{1}{3}v_{in}} = \frac{1 + 0j}{\sqrt{1^2 + (\omega RC)^2}}$$

$$\begin{aligned} \omega RC &= 2\pi f RC \\ &= 6.28 \cdot 100k \cdot \frac{20k}{3} \cdot 2n \\ &= 8.37 \end{aligned}$$

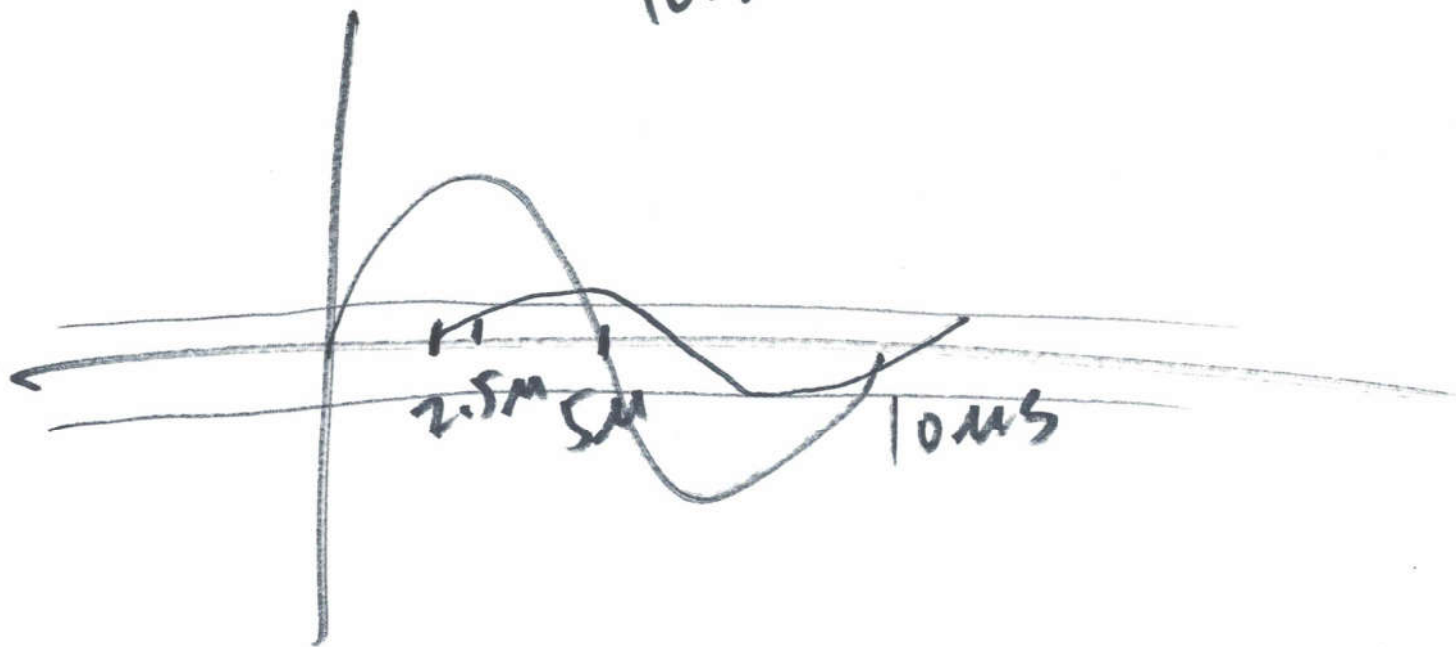
$$\frac{v_{out}}{\frac{1}{3}v_{in}} = \frac{1}{8.37}$$

$$\frac{V_{out}}{V_{in}} = \frac{1}{8.37} \cdot \frac{1}{3} = \frac{1}{25} = 0.04$$

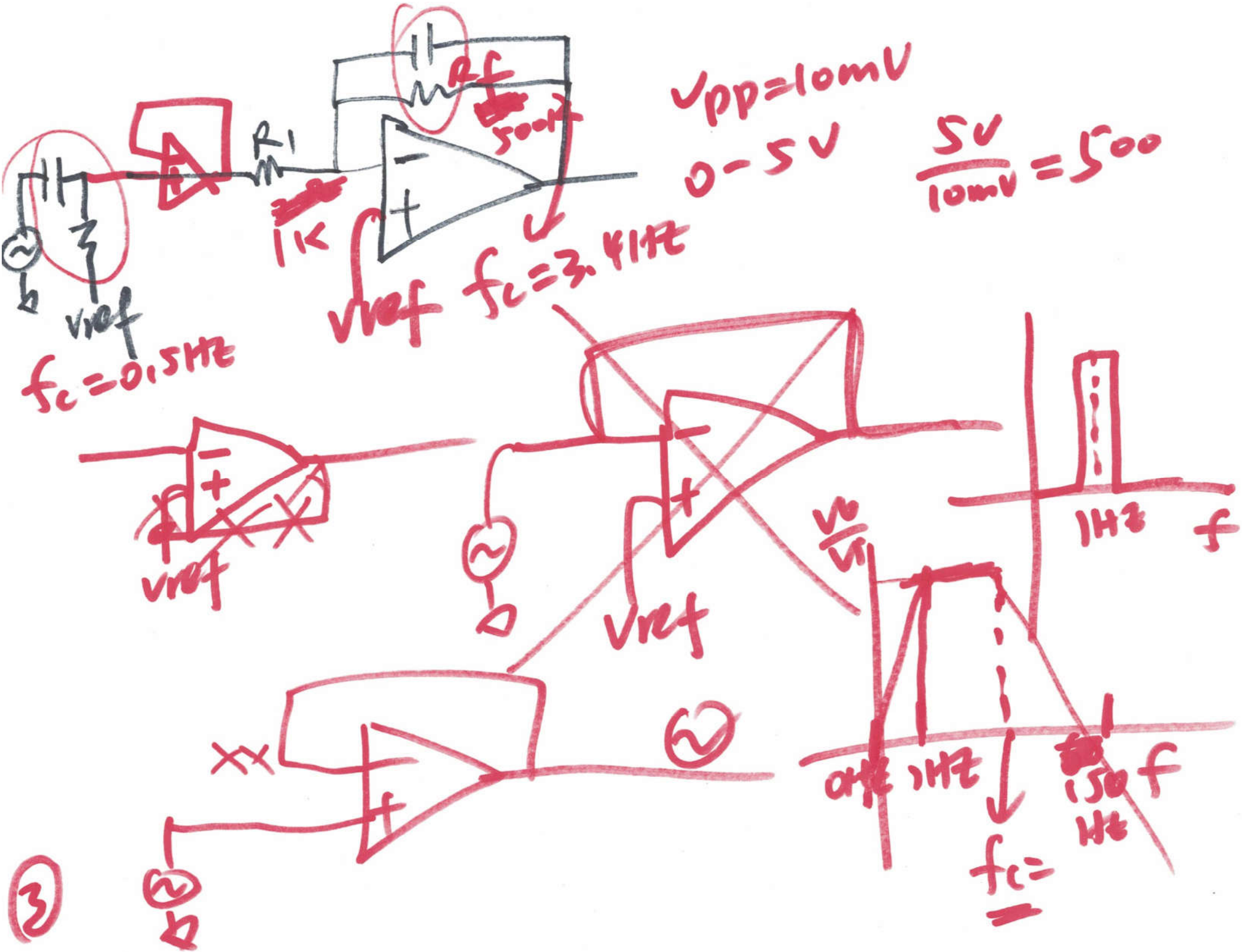
$$\Delta\theta = 0 - \tan^{-1} \frac{wRC}{1} = -\tan^{-1} 8.37 = \underline{83.2^\circ}$$

$$\Delta T = \frac{\Delta\theta}{360^\circ} \cdot 10 \mu s = \frac{-83.2^\circ}{360} \cdot 10 \mu s = \underline{\underline{-2.3 \mu s}}$$

$\frac{1}{100k\Omega}$

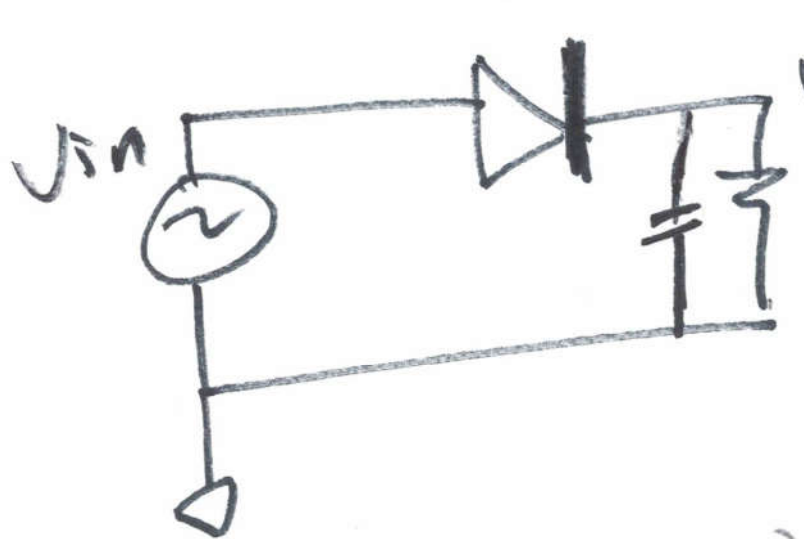


(2)

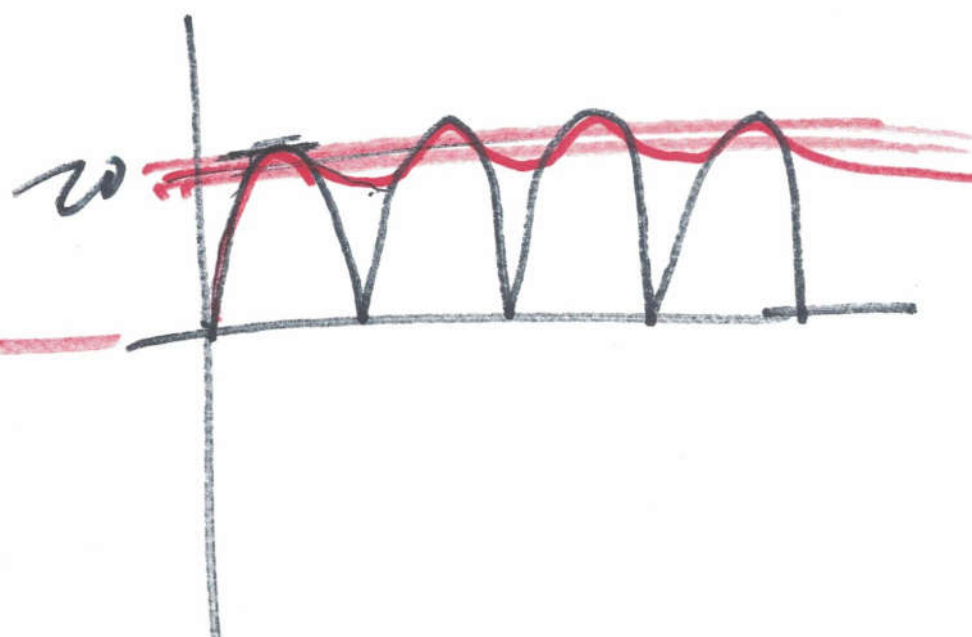
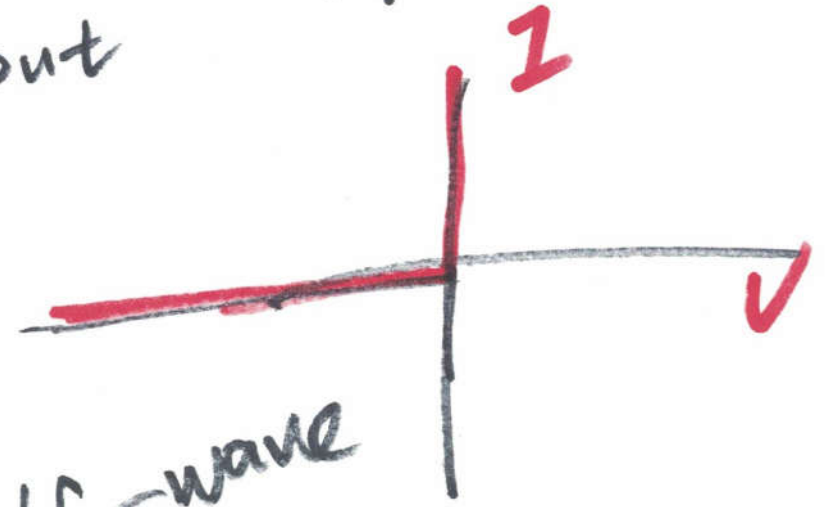
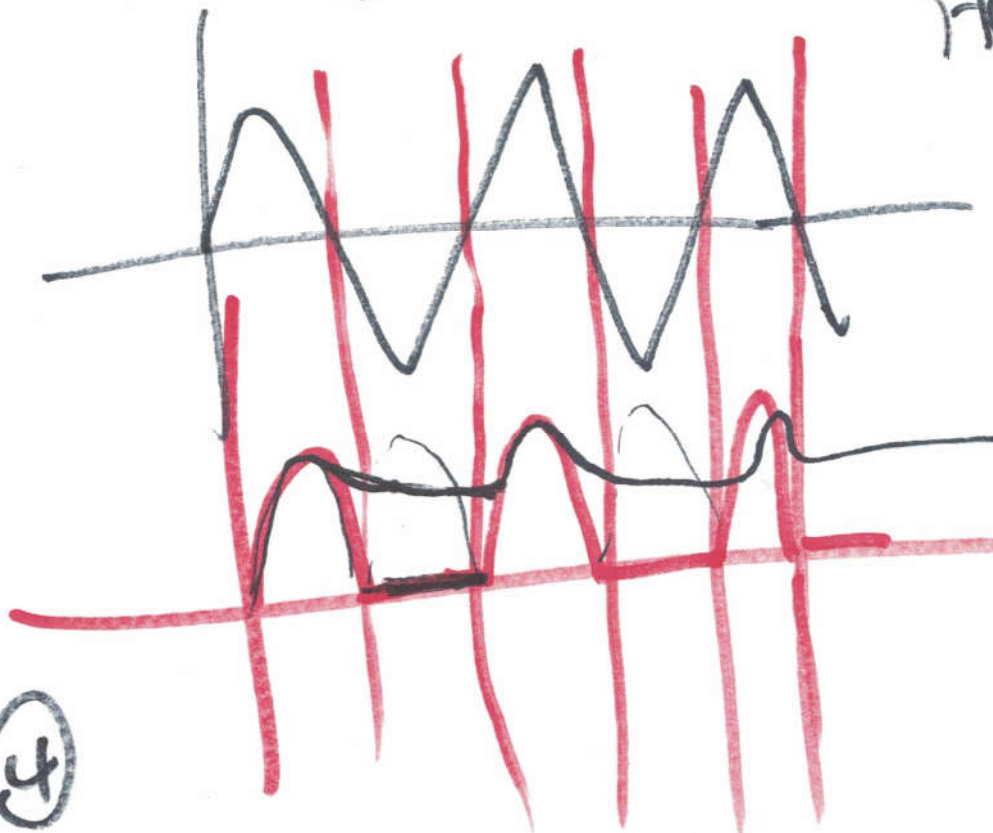


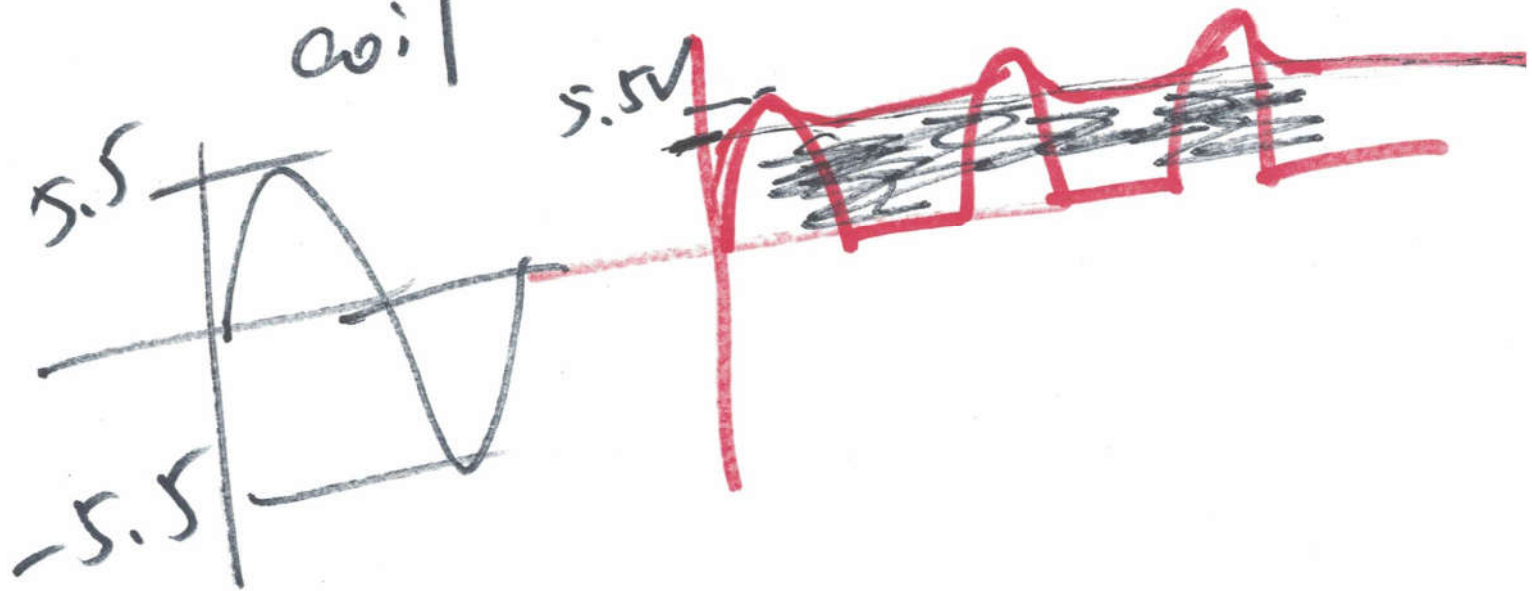
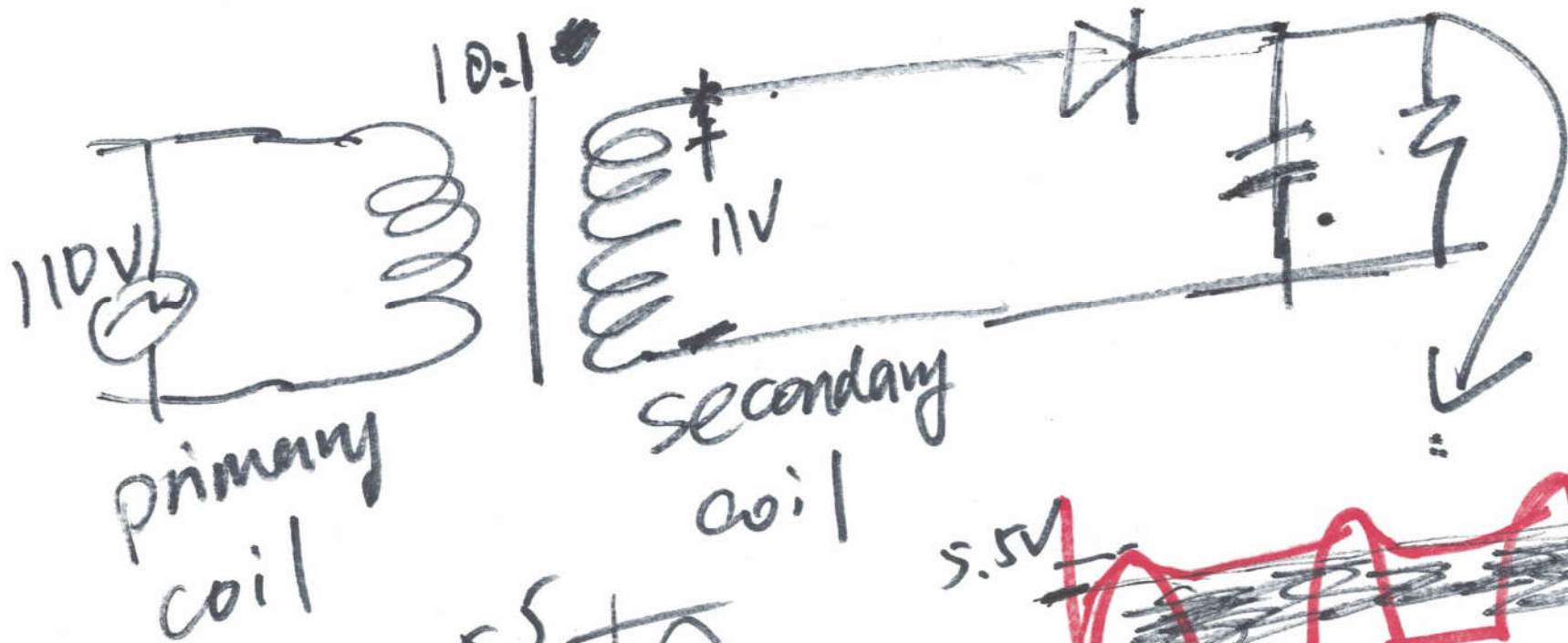


# The Rectifier (For power supplies)

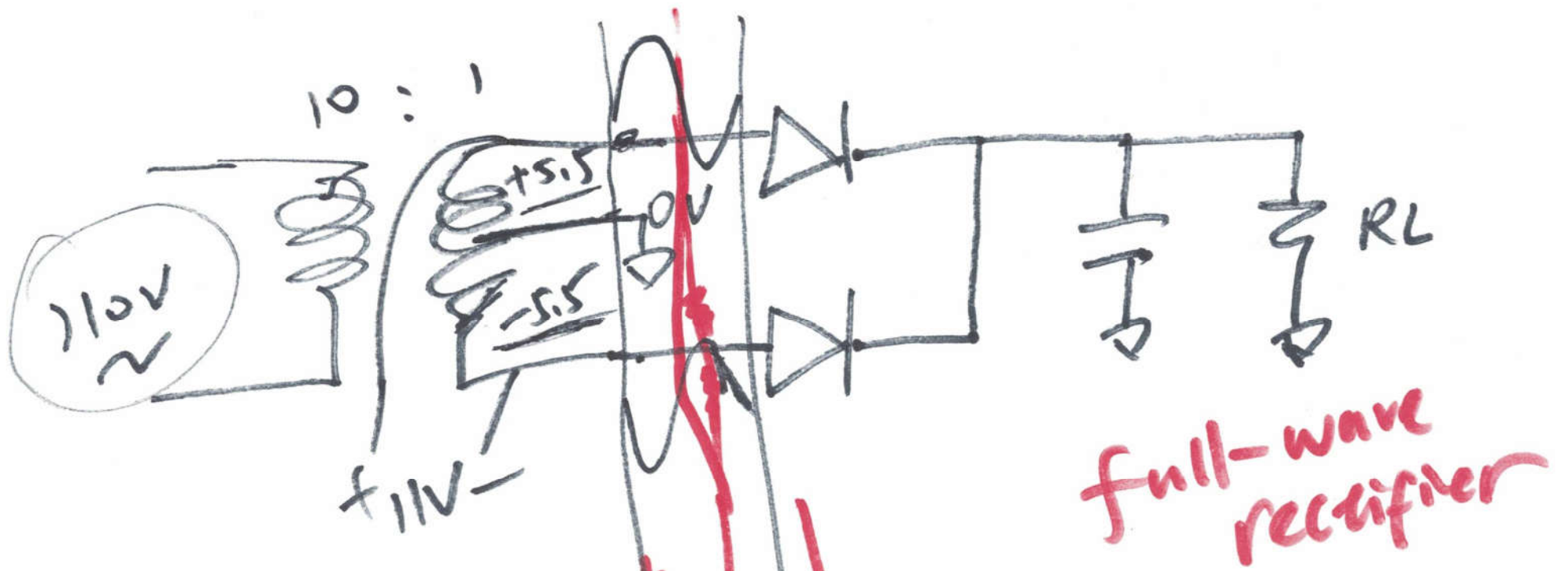


Half-wave  
rectifier

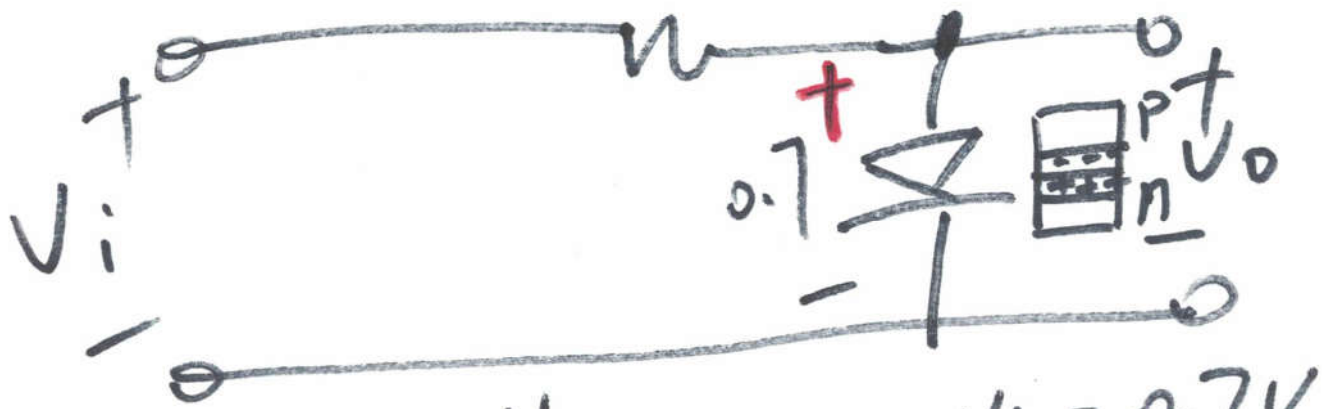




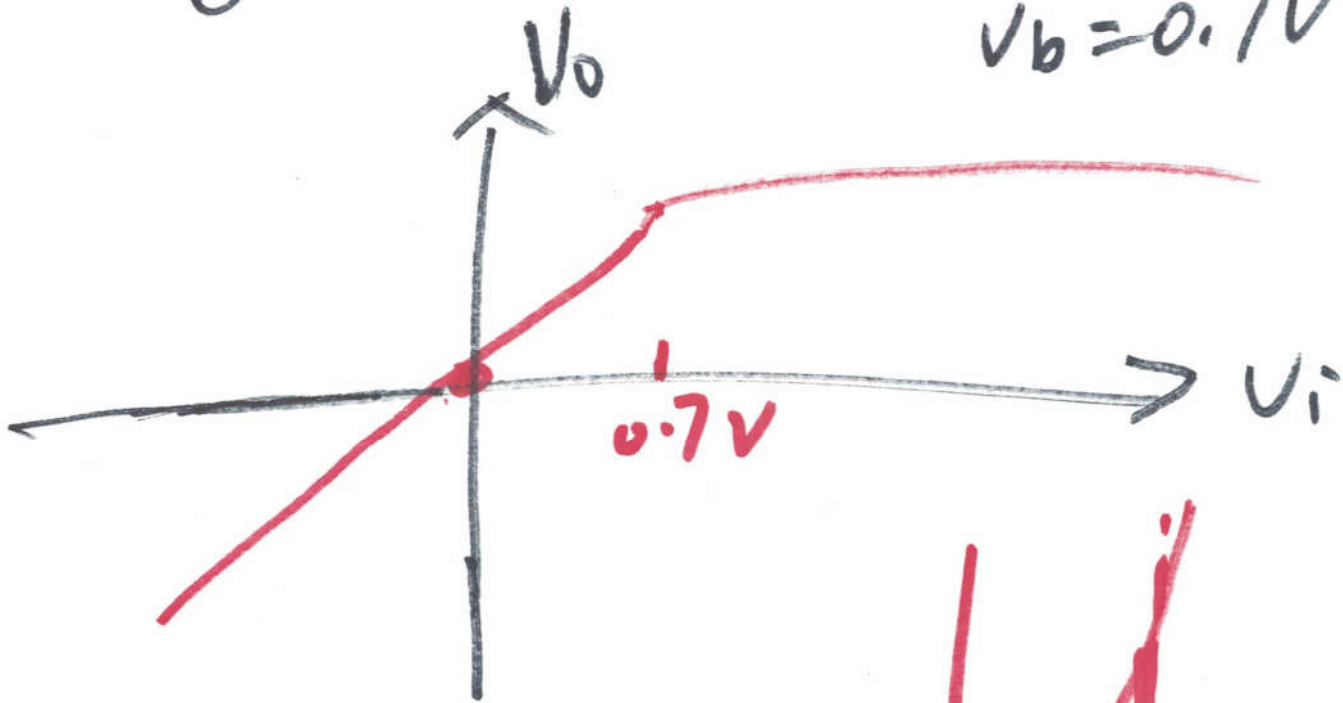
(5)



(b)



$V_b = 0.7V$



Q