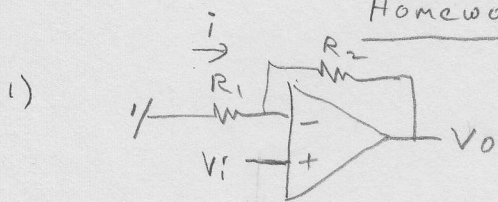


Homework 5 Solution

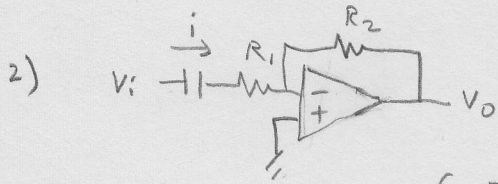


KVL: $V_i = -iR_1$ $V_o = -i(R_1 + R_2)$

$$\frac{V_o}{V_i} = \frac{(R_1 + R_2)}{R_1} \text{ Let } R_1 = 1K \quad 100 = \frac{(1K + R_2)}{1K}$$

$$\Downarrow$$

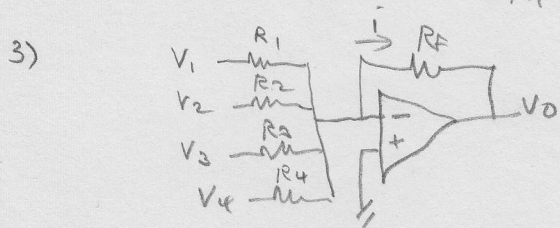
$$R_2 = 99K$$



KVL: $V_i = i(R_1 + \frac{1}{j\omega C})$ $V_o = -iR_2$

$$G = Re \left(\frac{-R_2}{R_1 + \frac{1}{j\omega C}} \right) = \frac{-\omega R_2 C}{\sqrt{1 + \omega^2 R_1^2 C^2}}$$

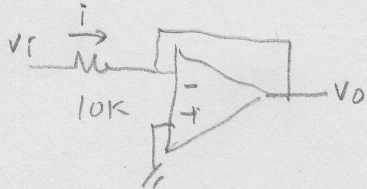
$$\omega R C = 1 \quad \frac{R_2}{R_1} = 100 \Rightarrow$$



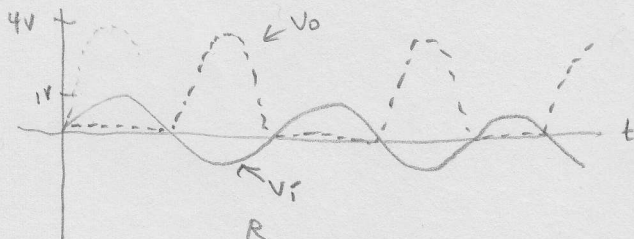
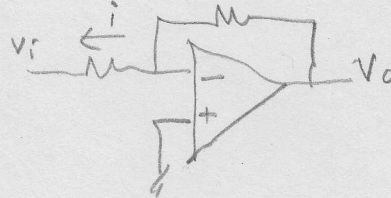
$$i = \frac{V_1}{R_1} + \frac{V_2}{R_2} + \frac{V_3}{R_3} + \frac{V_4}{R_4} \quad V_o = -iR_F$$

$$R_1 = \frac{R_F}{1} \quad R_2 = \frac{R_F}{2} \quad R_3 = \frac{R_F}{4} \quad R_4 = \frac{R_F}{8}$$

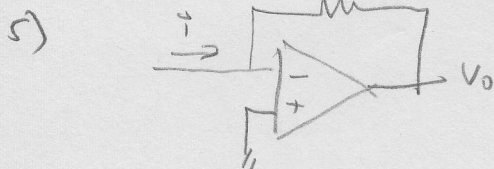
4) forward $V_i > 0 \quad V_o = 0$



reverse $V_i < 0 \quad V_o = -4V_i$



$\frac{1}{2}$ wave rectifier (precision)



$$V_o = -iR$$

$$-2 = -100nA R \Rightarrow R = 20m\Omega$$

6) $V_o =$

6) $V_o = A_o (V_i - 5)$ where $A_o \approx 10^5$

so $V_i > 5$ $V_o = 15V$

$V_i < 5$ $V_o = -15V$

