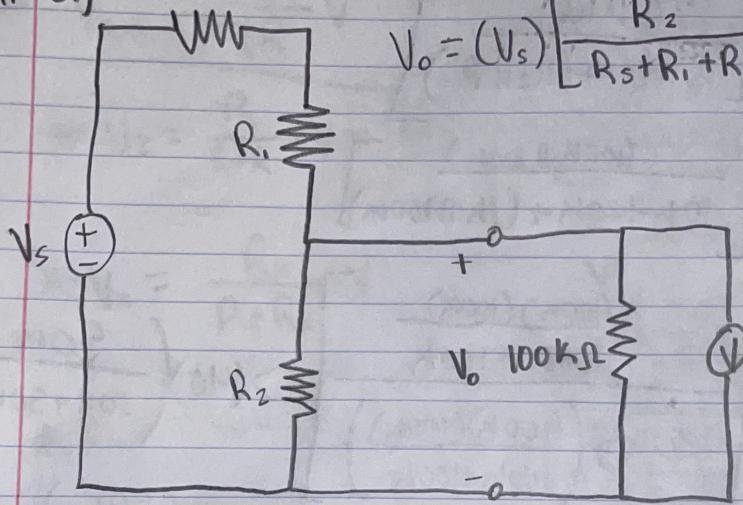


## ENGR 065: HW #4

1-i) a)



$$V_o = (V_s) \left[ \frac{R_2}{R_s + R_1 + R_2} \right]$$

$$R_2 = 1\text{k}\Omega \quad V_s = 31\text{V}$$

$$V_o = (V_s) \left[ \frac{(R_2 \parallel R_m)}{R_s + R_1 + (R_2 \parallel R_m)} \right]$$

$$V_o = (40) \left[ \frac{(1\text{k} \parallel 100\text{k})}{10\text{k} + 20\text{k} + (1\text{k} \parallel 100\text{k})} \right]$$

$$= (40) \left[ \frac{\frac{(1\text{k})(100\text{k})}{1\text{k}+100\text{k}}}{30\text{k} + \left[ \frac{(1\text{k})(100\text{k})}{1\text{k}+100\text{k}} \right]} \right]$$

$$V_o = (V_s) \left[ \frac{R_2}{R_s + R_1 + R_2} \right] \Rightarrow R_2 = 1\text{k}\Omega$$

$$R_s = 10\text{k}\Omega$$

$$R_1 = 20\text{k}\Omega$$

$$= (40) \left[ \frac{0.99\text{k}}{30\text{k} + 0.99\text{k}} \right] = 40 \left[ \frac{0.99\text{k}}{30.99\text{k}} \right]$$

$$V_o = (40) \left[ \frac{1\text{k}}{10\text{k} + 20\text{k} + 1\text{k}} \right] = (40) \left( \frac{1\text{k}}{31\text{k}} \right) = 1.29\text{V} = 1.278\text{V}$$

b)  $R_2 = 10\text{k}\Omega$

$$R_m = 100\text{k}\Omega$$

$$R_s = 10\text{k}\Omega$$

$$R_1 = 20\text{k}\Omega$$

$$V_o = (40) \left[ \frac{(10\text{k} \parallel 100\text{k})}{10\text{k} + 20\text{k} + (1\text{k} \parallel 100\text{k})} \right] \Rightarrow (40) \left[ \frac{\frac{(10\text{k})(100\text{k})}{10\text{k}+100\text{k}}}{30\text{k} + \frac{(10\text{k})(100\text{k})}{10\text{k}+100\text{k}}} \right]$$

$$V_o = (V_s) \left( \frac{R_2}{R_s + R_1 + R_2} \right)$$

$$= (40) \left( \frac{9.09\text{k}}{30\text{k} + 9.09\text{k}} \right) \Rightarrow (40) \left( \frac{9.09\text{k}}{39.09\text{k}} \right)$$

$$= 9.3\text{V}$$

$$R_2 = 10\text{k}\Omega$$

$$R_s = 10\text{k}\Omega$$

$$R_1 = 20\text{k}\Omega$$

$$\Rightarrow (40) \left( \frac{10\text{k}}{10\text{k} + 20\text{k} + 10\text{k}} \right) \Rightarrow (40) \left( \frac{10\text{k}}{40\text{k}} \right) = 10\text{V}$$