

HX is an acid. 0.72M HX solution has pH of 1.75. Is HX a strong acid?

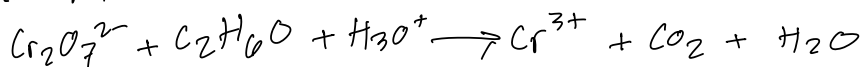
Is $[H_3O^+] = 0.72M$?

pH of 1.75 $\rightarrow -\log_{10}[H_3O^+] = 1.75$

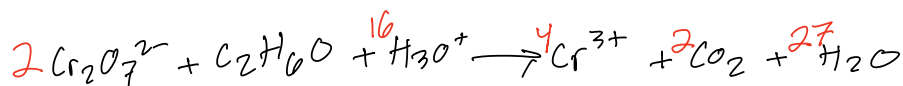
$$[H_3O^+] = 0.0178M$$

0.0178M much less than 0.72M so not
a strong acid

Redox titration



37.5 mL blood sample requires 19.25 mL of 0.085M $K_2Cr_2O_7$ to titrate
what is $[C_2H_6O]$? what is v/v% of BAC



$$0.01925 L \times 0.085 \frac{\text{mol } Cr_2O_7^{2-}}{L} = 1.636 \times 10^{-3} \text{ moles } Cr_2O_7^{2-}$$

$$1.636 \times 10^{-3} \text{ moles } Cr_2O_7^{2-} \times \frac{1 \text{ mol } C_2H_6O}{2 \text{ mol } Cr_2O_7^{2-}} = 8.2 \times 10^{-4} \text{ moles } C_2H_6O$$

$$\frac{8.2 \times 10^{-4} \text{ moles } C_2H_6O}{0.0375 L} = 0.022M C_2H_6O$$

$$8.2 \times 10^{-4} \text{ moles } C_2H_6O \times \frac{46g}{\text{mol}} = 0.0377g C_2H_6O \quad \text{-- assume } d_{\text{blood}} = d_{C_2H_6O} = \frac{1g}{mL}$$

$$\frac{0.0377 \text{ mL } C_2H_6O}{37.5 \text{ mL blood}} = 0.001 \rightarrow 0.1\%$$

HCl/NaOH titration

25.00 mL HCl titrated w/ 17.35 mL of 0.25 M NaOH to get to equiv pt. pH of original HCl? What pH in flask if we add 1.7 mL NaOH after equiv pt

$$0.01735 \text{ L NaOH} \times \frac{0.25 \text{ mol}}{\text{L}} = 4.34 \times 10^{-3} \text{ moles OH}^- \text{ added}$$

$$\text{so in orig flask } \frac{0.00434 \text{ moles HCl}}{0.025 \text{ L}} \rightarrow [\text{HCl}] = 0.1735 \text{ M}$$

For strong acid if $[\text{HCl}] = 0.1735 \text{ M}$, $[\text{H}_3\text{O}^+] = 0.1735 \text{ M}$
 $\text{pH} = -\log_{10}(0.1735) = 0.76$

$$0.0017 \text{ L NaOH} \times \frac{0.25 \text{ mol}}{\text{L}} = 4.25 \times 10^{-4} \text{ moles OH}^-$$
$$\frac{4.25 \times 10^{-4}}{0.04405 \text{ L}} = 9.65 \times 10^{-3}$$

$$[\text{H}_3\text{O}^+] \times [\text{OH}^-] = 1 \times 10^{-14}$$

$$[\text{H}_3\text{O}^+] = \frac{1 \times 10^{-14}}{9.65 \times 10^{-3}} = 1.04 \times 10^{-12} \rightarrow \text{pH} = 11.98$$

C_6H_{14} combustion. If you burn 75g how many grams CO_2 produced



$$75 \text{ g C}_6\text{H}_{14} \times \frac{1 \text{ mole}}{86 \text{ g}} = 0.87 \text{ mol C}_6\text{H}_{14} \times \frac{6 \text{ mole CO}_2}{1 \text{ mole C}_6\text{H}_{14}} \times \frac{44.02 \text{ g CO}_2}{1 \text{ mol CO}_2}$$
$$= 230 \text{ g CO}_2$$