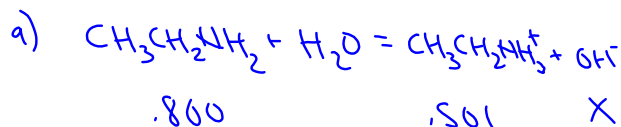


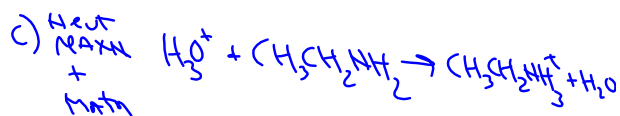
Buffer Quiz

$$b) 5.6 \cdot 10^{-4} = \frac{(.501)(X)}{(.800)}$$

$$X = 8.9 \cdot 10^{-4} = [\text{OH}^-]$$

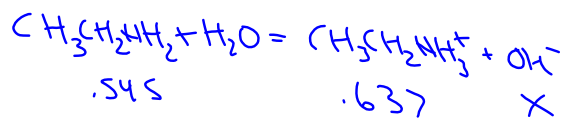
$$\text{pOH} = 3.05$$

$$\text{pH} = 10.95$$



.0200 ml - .0200 ----- 	.0800 - .0200 ----- 	.0501 + .0200 -----
.0600 ml ----- .110 L	.0701 ml ----- .110 L	
↓ .545 M	↓ .637 M	

back to buffer:

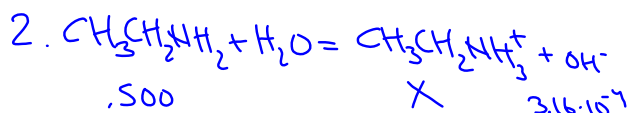


$$5.6 \cdot 10^{-4} = \frac{(.637)(X)}{(.545)}$$

$$X = 4.8 \cdot 10^{-4} = [\text{OH}^-]$$

$$\text{pOH} = 3.32$$

$$\text{pH} = 10.68$$



$$\text{pH} = 10.50 \quad 5.6 \cdot 10^{-4} = \frac{(X)(3.16 \cdot 10^{-4})}{(.500)}$$

$$\text{pOH} = 3.50$$

$$[\text{OH}^-] = 10^{-3.50}$$

$$= 3.16 \cdot 10^{-4}$$

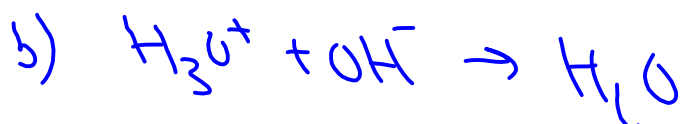
$$X = .886 \text{ ml/L} \times .200 \text{ L} \cdot \frac{81.5 \text{ g}}{\text{ml}} =$$

$$\underline{14.4 \text{ g}}$$

Titration

1. a) $[H_3O^+] = .500 M$

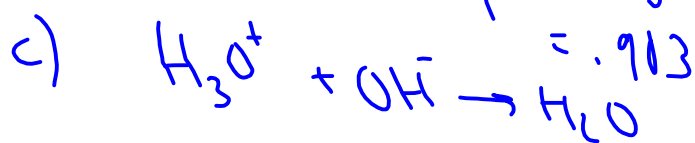
$$pH = .301$$



$$\begin{array}{r} .0250 \text{ mol} \quad .0125 \\ - .0125 \quad - .0125 \\ \hline \end{array}$$

$$\frac{.0125 \text{ mol}}{.100 L} = .125 M \text{ Xs } H_3O^+$$

$$pH = -\log(.125)$$

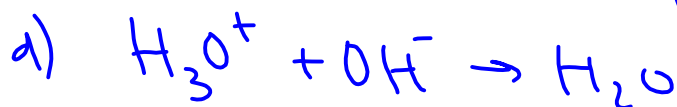


$$\begin{array}{r} .0250 \quad .0250 \\ - .0250 \quad - .0250 \\ \hline \end{array}$$

EQUIVALENCE!

H_2O left

$$pH = 7.00$$



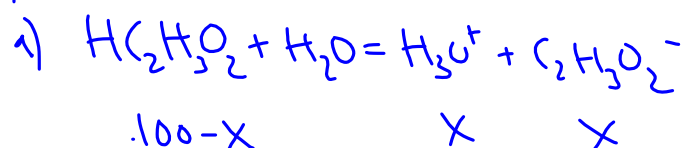
$$\begin{array}{r} .0250 \quad .0313 \\ - .0250 \quad - .0250 \\ \hline \end{array}$$

$$\frac{.0063 \text{ mol Xs } OH^-}{.175 L}$$

$$[OH^-] = .036 M$$

$$pOH = 1.44, \quad pH = 12.56$$

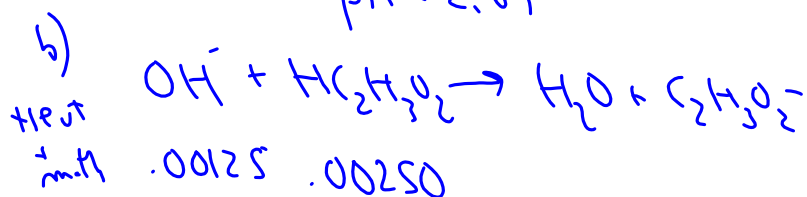
2.



$$K_a = 1.8 \cdot 10^{-5} = \frac{x^2}{.100 - x}$$

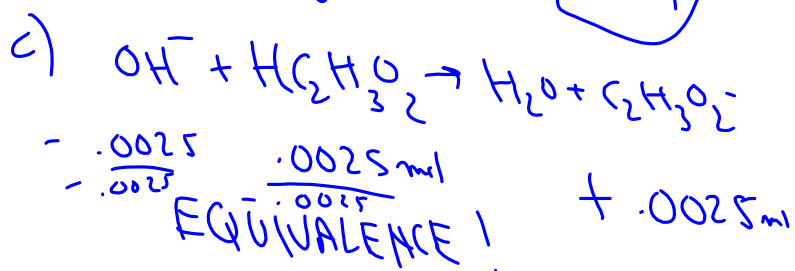
$$x = 1.3 \cdot 10^{-3} \approx [\text{H}_3\text{O}^+]$$

$$\text{pH} = 2.89$$



midpt! $\therefore \text{pH} = \text{p}K_a$

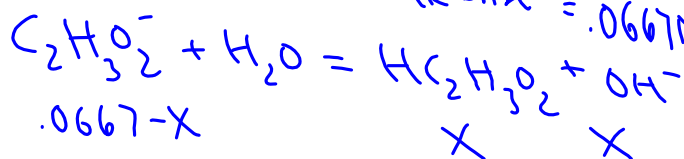
$$-\log(1.8 \cdot 10^{-5}) = \boxed{4.74}$$



what's left?

$$\text{C}_2\text{H}_3\text{O}_2^- = \frac{.0025 \text{ ml}}{.0375 \text{ L}}$$

weak base = .0667 M

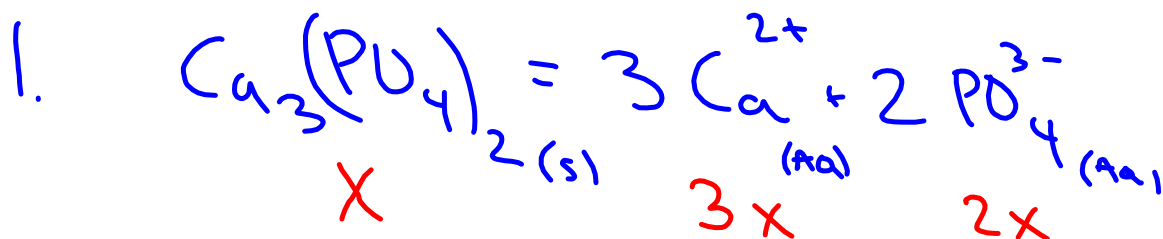


$$K_b = \frac{K_w}{K_a} = 5.6 \cdot 10^{-10} = \frac{x^2}{.0667 - x}$$

$$x = 6.1 \cdot 10^{-6} = [\text{OH}^-]$$

$$\text{pOH} = 5.21$$

$$\text{pH} = \underline{8.79}$$

K_{sp} Quiz

$$K_{sp} = 1.3 \cdot 10^{-32} = [3\text{X}]^3 [2\text{X}]^2$$

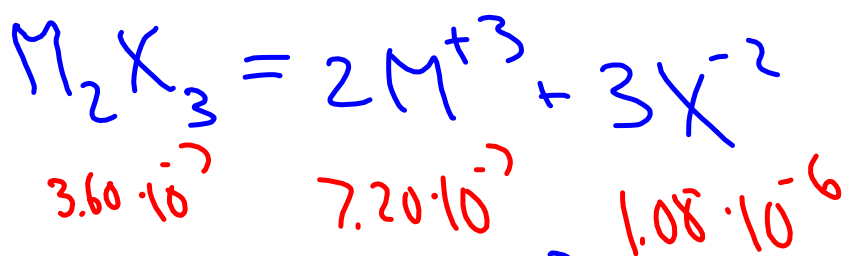
$$\text{X} = 1.6 \cdot 10^{-7} \text{ M}$$

in .200 M Na₃PO₄:

$$1.32 \cdot 10^{-32} = [3\text{X}]^3 [.200]^2$$

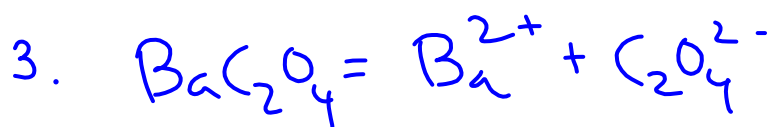
$$\text{X} = 2.3 \cdot 10^{-11} \text{ M}$$

2.



$$K_{sp} = [7.20 \cdot 10^{-7}]^2 [1.08 \cdot 10^{-6}]^3$$

$$= 6.53 \cdot 10^{-31}$$



$$[\text{Ba}^{2+}]_{\text{AM}} = .250 \left(\frac{150}{250} \right) = .150 \text{ M}$$

$$[\text{C}_2\text{O}_4^{2-}]_{\text{AM}} = .200 \left(\frac{100}{250} \right) = .080 \text{ M}$$

$$Q = [.150][.080]$$

$$Q = 1.2 \cdot 10^{-2} > K_{\text{sp}} \therefore \text{ppt forms}$$



$$.150 \quad .080$$

$$\begin{array}{rcl} \leftarrow 100\% & & \\ & \begin{array}{r} -.080 \\ \hline .070 \end{array} & \begin{array}{r} -.080 \\ \hline 0 \end{array} \\ \rightarrow & \begin{array}{r} +X \\ \hline .070+X \end{array} & \begin{array}{r} +X \\ \hline X \end{array} \end{array}$$

$$2.3 \cdot 10^{-8} = [.070+X][X]$$

$$X = 3.3 \cdot 10^{-7} \text{ M} = [\text{C}_2\text{O}_4^{2-}]$$

$$[\text{Ba}^{2+}] = .070 \text{ M}$$

$$[\text{K}^+] = .200 \times 2 \left(\frac{100}{250} \right) = .160 \text{ M}$$

$$[\text{Br}^-] = 2 \times .250 \left(\frac{150}{250} \right) = .300 \text{ M}$$