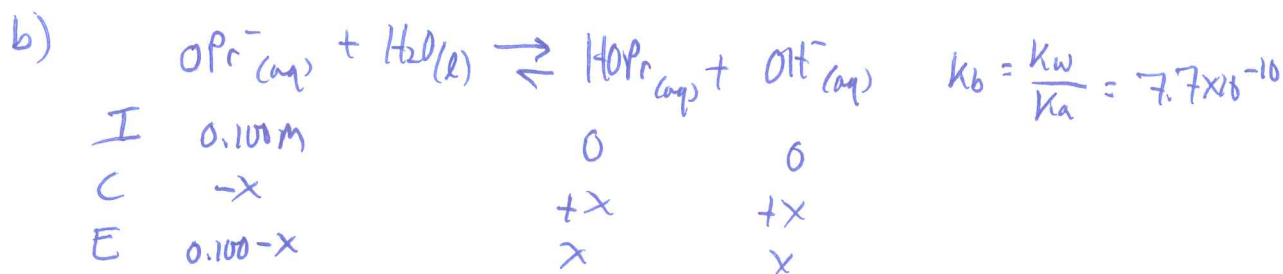


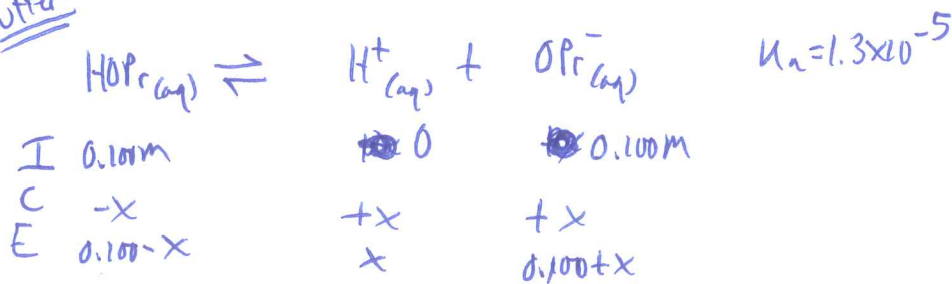
$$K_a = 1.3 \times 10^{-5} = \frac{x^2}{0.100} \quad x = [H^+] = 1.1 \times 10^{-3} M \quad pH = \boxed{2.96}$$



$$K_b = 7.7 \times 10^{-10} = \frac{x^2}{0.100} \quad x = [OH^-] = 8.8 \times 10^{-6} M \quad pOH = 5.06 \quad pH = \boxed{8.94}$$

c)  $[H^+] = [OH^-] \quad pH = 7.00$

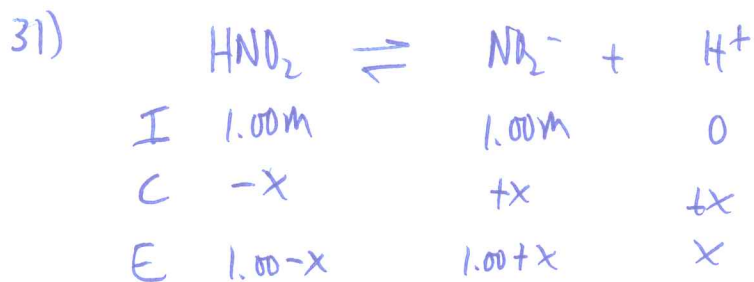
d) buffer



$$1.3 \times 10^{-5} = \frac{(0.100)(x)}{0.100} = x = [H^+] = 1.3 \times 10^{-5} M \quad pH = 4.89$$

OR

$$pH = pK_a + \log \frac{[base]}{[acid]} = pK_a + \log \left( \frac{0.100}{0.100} \right) = pK_a = -\log(1.3 \times 10^{-5}) = 4.89$$

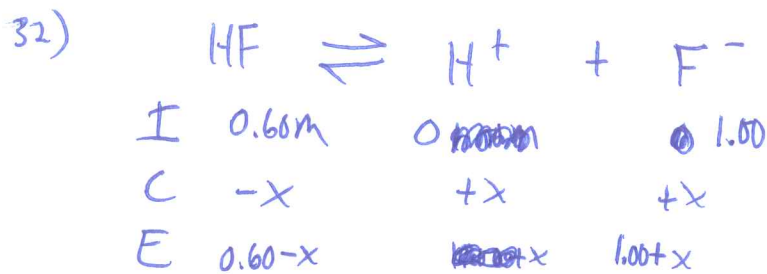


$$K_a = 4.0 \times 10^{-4} = \frac{(1.00)(x)}{(1.00)}$$

$$x = 4.0 \times 10^{-4} \text{ M} = [\text{H}^+] \quad \text{pH} = \boxed{3.40}$$

OR

$$\text{pH} = \text{p}K_a + \log \frac{[\text{base}]}{[\text{acid}]} = \boxed{3.40}$$



$$K_a = 7.2 \times 10^{-4} = \frac{(1.00)(x)}{(0.60)}$$

$$x = [\text{H}^+] = 4.3 \times 10^{-4} \text{ M} \quad \text{pH} = \boxed{3.37}$$

42)

$$\text{pH} = \text{p}K_a + \log \frac{[\text{NO}_2^-]}{[\text{HNO}_2]} \quad 3.55 = -\log(4.0 \times 10^{-4}) + \log \frac{[\text{NO}_2^-]}{[\text{HNO}_2]}$$

$$3.55 = 3.40 + \log \frac{[\text{NO}_2^-]}{[\text{HNO}_2]}, \quad \frac{[\text{NO}_2^-]}{[\text{HNO}_2]} = 10^{0.15} = 1.4 = \frac{\text{mol NO}_2^-}{\text{mol HNO}_2}$$

$$\frac{\text{mol NO}_2^-}{\text{mol HNO}_2} = 1.4 = \frac{(1.00 - x) \cdot \frac{0.50 \text{ ml}}{\text{L}}}{x \cdot \frac{0.50 \text{ ml}}{\text{L}}} = \frac{0.50 - (0.50)x}{(0.50)x}$$

$$0.70x = 0.50 - (0.50)x \quad (1.20)x = 0.50 \quad x = 0.42 \text{ L}$$

Need 0.42 L of 0.50M HNO<sub>2</sub> and 1.00 - 0.42 = 0.58 L of 0.50M NaNO<sub>2</sub>

79) a) yellow b) green c) yellow d) blue

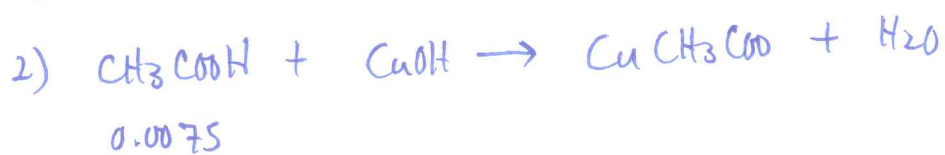
80) a) yellow b) yellow c) green d) colorless

$$119) \text{ pH} = \text{pK}_a + \log \frac{[\text{C}_7\text{H}_4\text{O}_2\text{F}^-]}{[\text{C}_7\text{H}_5\text{O}_2\text{F}]} = 2.90 + \log \left[ \frac{(55.0 \text{ mL} \times 0.472 \text{ M}) / 130.0 \text{ mL}}{(75.0 \text{ mL} \times 0.275 \text{ M}) / 130.0 \text{ mL}} \right]$$

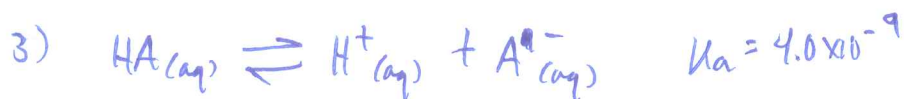
$$\text{pH} = 2.90 + \log \left( \frac{26.0}{20.6} \right) = 2.90 + 0.101 = \boxed{3.00}$$

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1) B



$$\frac{0.0075}{0.015} = \boxed{0.500\text{M}} \quad \boxed{D}$$



I	0.10M	0	0
C	-x	+x	+x
E	0.10-x	x	x

$$\frac{x^2}{0.10} = 4.0 \times 10^{-9} \quad x = \boxed{2.0 \times 10^{-5}\text{M}} \quad \boxed{B}$$



I	0.25M	0	0
C	-x	+x	+x
E	0.25-x	x	x

$$\frac{x^2}{0.25} = 4.00 \times 10^{-4} \quad x = \boxed{1.0 \times 10^{-2}\text{M}} \quad \boxed{D}$$

5)  D

12)  A

8)  C

13)  C

9)  C

14) OMIT

16)  C

15)  D

11)  A