

# Multiple Choice Response Sheet

Name: \_\_\_\_\_

1. B

2. B

3. C

4. A

5. C

6. A

7. C

8. D

9. D

10. C

11. B

12. D

13. C

14. C

15. ~~C~~

16. ~~D~~

17. ~~A~~

18. C

19. C

20. A

21. B

22. A

23. B

24. D

25. D

26. A

27. B

28. B

29. A

30. B

31. A

32. B

33. B

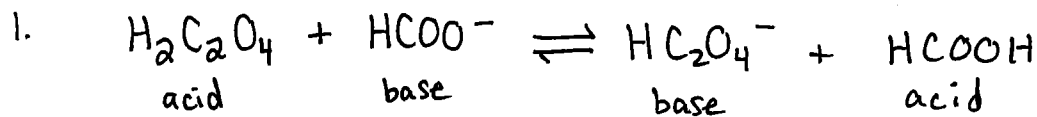
34. B

35. \_\_\_\_\_

36. \_\_\_\_\_

Acid-Base #1

46



Products will be favoured because  $\text{H}_2\text{C}_2\text{O}_4$  is a stronger acid than  $\text{HCOOH}$   $\therefore$  will get to donate/react more often.

$$2. \quad [\text{H}_3\text{O}^+] = [\text{OH}^-]$$

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 6.76 \times 10^{-15}$$

$$(x)(x) = 6.75 \times 10^{-15}$$

$$x = \sqrt{6.75 \times 10^{-15}}$$

$$[\text{H}_3\text{O}^+] = 8.22 \times 10^{-8} \text{ M}$$

3. Beaker 1

$$\begin{aligned} [\text{HCl}] &= [\text{H}^+] \\ &= \frac{(1.0 \text{ M})(40.0 \text{ mL})}{200.0 \text{ mL}} \\ &= 0.20 \text{ M} \end{aligned}$$

$$[\text{H}^+] = 0.50 \text{ M}$$

Beaker 2

$$\begin{aligned} [\text{HBr}] &= [\text{H}^+] \\ &= \frac{(1.0 \text{ M})(60.0 \text{ mL})}{200.0 \text{ mL}} \\ &= 0.30 \text{ M} \end{aligned}$$

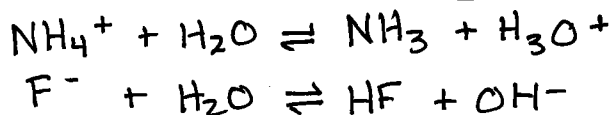
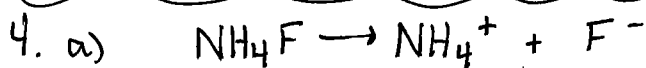
Beaker 3

$$\begin{aligned} [\text{NaOH}] &= [\text{OH}^-] \\ &= \frac{(0.50 \text{ M})(100.0 \text{ mL})}{200.0 \text{ mL}} \\ [\text{OH}^-] &= 0.25 \text{ M} \end{aligned}$$

$$\begin{aligned} [\text{H}^+]_{\text{xs}} &= 0.50 \text{ M} - 0.25 \text{ M} \\ &= 0.25 \text{ M} \end{aligned}$$

$$\text{pH} = -\log(0.25 \text{ M})$$

$$\text{pH} = 0.60$$



$$\text{b) } K_a(\text{NH}_4^+) = 5.6 \times 10^{-10}$$

$$\begin{aligned} K_b(\text{F}^-) &= \frac{1.00 \times 10^{-14}}{3.5 \times 10^{-4}} \\ &= 2.9 \times 10^{-11} \end{aligned}$$

$K_a > K_b \therefore$  the solution will be acidic.