

Multiple Choice Response Sheet

Name: _____

1. D

2. A

3. A

4. B

5. B

6. B

7. C

8. C

9. B

10. D

11. D

12. B

13. A

14. A

15. C

16. A

17. D

18. A

19. D

20. C

21. A

22. D

23. C

24. A

25. A

26. B

27. B

28. A

29. A

30. C

31. A

32. _____

33. _____

34. _____

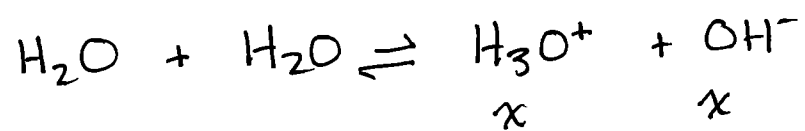
35. _____

36. _____

Acid-Base
#1

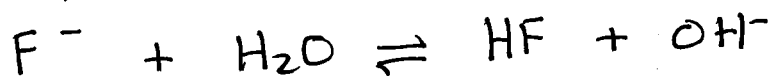
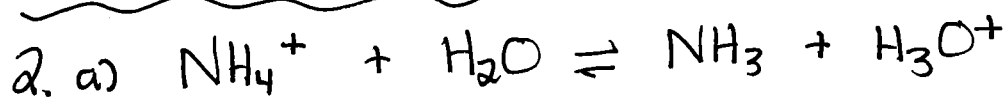
41

$$1. \quad K_w = [H^+][OH^-] = 6.76 \times 10^{-15}$$



$$(x)(x) = 6.76 \times 10^{-15}$$

$$x = [H_3O^+] = \sqrt{6.76 \times 10^{-15}} \\ = 8.22 \times 10^{-8}$$



$$b) \quad K_a(NH_4^+) = 5.6 \times 10^{-10}$$

$$K_b(F^-) = \frac{1.00 \times 10^{-14}}{3.5 \times 10^{-4}}$$

$$K_b = 2.86 \times 10^{-11}$$

$$K_a > K_b \therefore$$

NH_4F is acidic

$$3. \quad [H^+]$$

$$= \frac{(0.050 M)(100.0 mL)}{400.0 mL}$$

$$= 0.0125 M$$

$$[OH^-]_{xs} = 0.076 M - 0.0125 M$$

$$[OH^-]_{xs} = 0.063 M. \quad * 2 \text{ S.F.}$$

$$pOH = -\log [OH^-] \\ = -\log(0.063 M) \\ = 1.20 \dots$$

$$pH = 14 - 1.20 \dots$$

$$\boxed{= 12.80}$$

2 after decimal

$$2[OH^-] = [Sr(OH)_2]$$

$$[Sr(OH)_2]$$

$$= \frac{(0.050 M)(300.0 mL)}{400.0 mL}$$

$$= 0.0375 M$$

$$[OH^-] = 0.075 M$$

Acid-Base #1

Multiple Choice Response Sheet

Name: _____

Key

1. B

2. C

3. A

4. D

5. B

6. C

7. B

8. A

9. A

10. B

11. B

12. A

13. A

14. B

15. ~~B~~ C

16. ~~A~~ C

17. B

18. C

19. C

20. B

21. A

22. B

23. D

24. B

25. C

26. C

27. B

28. B

29. C

30. D

31. _____

32. _____

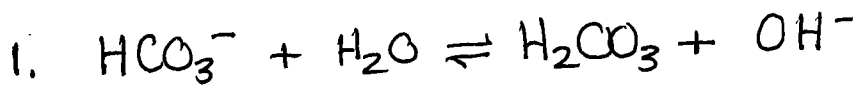
33. _____

34. _____

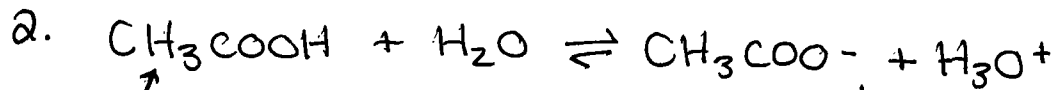
35. _____

36. _____

41



↖ must be something
with an H & a \ominus
must accept H^+
from H_2O



↖ must
be an
acid

* in order to make H_2O act ^{only} as a base,
it must be paired with an acid

3. The only thing that is true of pure H_2O at any temperature
is that $[\text{H}_3\text{O}^+] = [\text{OH}^-]$ (which means it is neutral)

$$[\text{H}_3\text{O}^+] = 10^{-6.51}$$

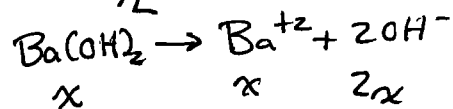
$$[\text{H}_3\text{O}^+] = 3.09 \dots \times 10^{-7} \text{M} = [\text{OH}^-]$$

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

$$= (3.09 \dots \times 10^{-7} \text{M})(3.09 \dots \times 10^{-7} \text{M})$$

$$= 9.5 \times 10^{-14}$$

$$4. \frac{0.44 \text{g Ba(OH)}_2}{0.250 \text{L}} \times \frac{1 \text{ mol Ba(OH)}_2}{171.3 \text{g}} = 0.0102 \dots \text{ mol/L}$$



$$[\text{OH}^-] = 2 \times 0.01027 \dots$$

$$p\text{OH} = -\log [\text{OH}^-]$$

$$= -\log (0.0205 \dots)$$

$$p\text{H} = 14 - p\text{OH}$$

$$= 14 - 1.687 \dots$$

$$p\text{H} = 12.31$$

Multiple Choice Response Sheet

Name: _____

1. D

2. D

3. C

4. A

5. C

6. B

7. B

8. D

9. C

10. A

11. B

12. A

13. A

14. A

15. D

16. D

17. C

18. B

19. A

20. D

21. B

22. C

23. B

24. D

25. A

26. D

27. C

28. D

29. C

30. _____

31. _____

32. _____

33. _____

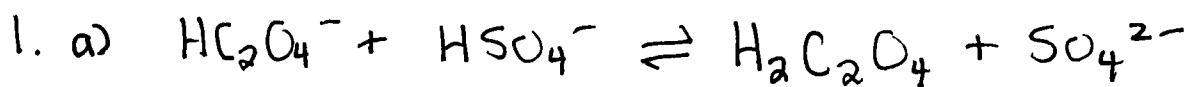
34. _____

35. _____

36. _____

Acid-Base
#1

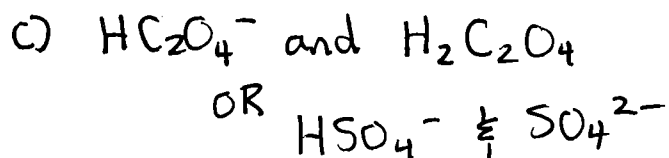
41



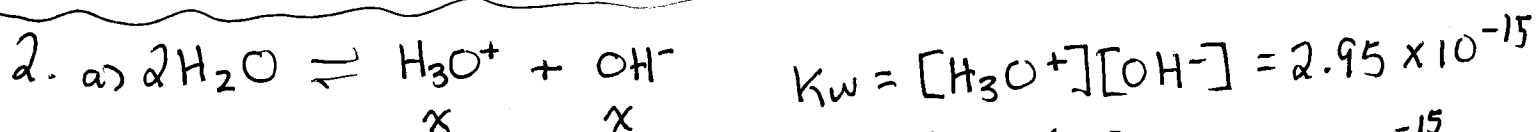
b) $K_a(\text{HSO}_4^-) = 1.2 \times 10^{-2}$

$K_a(\text{HC}_2\text{O}_4^-) = 6.4 \times 10^{-5}$

HSO_4^- is a stronger acid than HC_2O_4^- \therefore will be able to donate more often



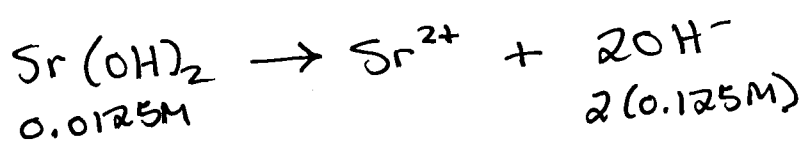
d) when comparing the 2 acids, $\text{H}_2\text{C}_2\text{O}_4$ is slightly stronger than HSO_4^- \therefore gets to donate/react more often. This means more reactants will be produced making their formation favoured.



$x = [\text{H}_3\text{O}^+] = \sqrt{2.95 \times 10^{-15}} = (x)(x) = 2.95 \times 10^{-15}$
 $= 5.43 \dots \times 10^{-8} \text{M}$ $\text{pH} = -\log(5.43 \dots \times 10^{-8} \text{M})$
 $\text{pH} = 7.265$

b) Neutral. No matter what the temperature of water is, $[\text{H}_3\text{O}^+] = [\text{OH}^-]$ which would make the solution neutral.

3. $\frac{1.216 \text{ g Sr(OH)}_2}{0.800 \text{ L}} \times \frac{1 \text{ mol}}{121.6 \text{ g}} = 0.0125 \text{ mol/L Sr(OH)}_2$



$[\text{OH}^-] = 0.025 \text{M}$

$[\text{OH}^-]_{\text{xs}} = 0.025 \text{M} - 0.010 \text{M}$
 $= 0.015 \text{M}$

Multiple Choice Response Sheet

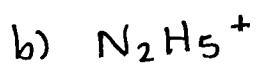
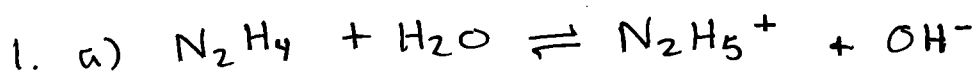
Name: _____

1. B
2. D
3. A
4. B
5. D
6. A
7. A
8. B
9. D
10. B
11. A
12. A
13. B
14. C
15. A
16. C
17. C
18. A

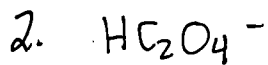
Acid-Base
#1

42

19. A
20. B
21. B
22. B
23. B
24. C
25. D
26. B
27. B
28. ~~B~~ D
29. D
30. A
31. B
32. C
33. _____
34. _____
35. _____
36. _____



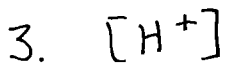
$$K_a = \frac{1.00 \times 10^{-14}}{9.6 \times 10^{-7}} = 1.0 \times 10^{-8}$$



$$K_a = 6.4 \times 10^{-5}$$

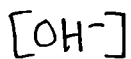
$$K_b = \frac{1.00 \times 10^{-14}}{5.9 \times 10^{-2}} = 1.69 \times 10^{-13}$$

$K_a > K_b \therefore$ will act as an acid predominantly



$$(35.0 \text{ mL})(1.00 \text{ M}) = (210 \text{ mL})x$$

$$[\text{H}^+] = 0.166\bar{6} \text{ M} = 0.17 \text{ M}$$



$$(175.0 \text{ mL})(0.25 \text{ M}) = (210 \text{ mL})x$$

$$[\text{OH}^-] = 0.21 \text{ M}$$

$$[\text{OH}^-] = 0.21 \text{ M} - 0.17 \text{ M} = 0.04 \text{ M}$$

$$\text{pOH} = -\log(0.04 \text{ M}) \\ = 1.3979 \dots$$

$$\text{pH} = 14 - 1.3979 \dots$$

$$\text{pH} = 12.6$$