Guided/Independent Practice

1-9 Directions: Determine each of the following as being true of acidic(A), basic(B), or neutral (C) solutions at 25°C.

1. $[H_3O^{1+}]=2.00x10^{-4}M$ A
2. $[H_3O^{1+}]=4.30x10^{-10}M$ B
3. $[OH^{1-}]=9.80x10^{-7}M$ A
4. $[OH^{1-}]=7.00x10^{-11}M$ A
5. $[H_3O^{1+}]=[OH^{1-}]$ N
6. pH=3.00 A
7. pH=13.0 B
8. pOH=9.00 A
9. pOH=5.00 B

10-13. Determine the pH and pOH of the following strong acid solutions.

10. $3.41x10^{-2}M$ HCl
11. $1.50x10^{-3}M$ HNO_3
12. $1.00x10^{-5}M$ HI
13. $1.00x10^{-4}M$ HBr

(10) pOH = 12.53
pH = 1.47

(11) pH = 2.824
pOH = 11.176

(12) pH = 5.000
pOH = 9.000

(13) pH = 4.000
pOH = 10.000

14-16. Determine the pH and pOH of the following strong base solution.

14. $3.75x10^{-2}M$ NaOH
15. $1.27x10^{-3}M$ $Sr(OH)_2$ x2
16. $1.00x10^{-4}M$ LiOH

(14) pH = 12.574
pOH = 1.426

(15) pH = 11.405
pOH = 2.595

(16) pH = 10.000
pOH = 4.000

17-19. Determine the hydrogen and hydroxide ion concentrations in a solution that is $1.57x10^{-4}M$ HCl.

17. Calculate the $[H_3O^{1+}]$ concentration. 1.57×10^{-4}
18. Calculate the $[OH^{1-}]$ concentration. 6.369×10^{-11}
19. Is the solution acidic(A)or basic(B)? A

20-22. Determine the hydrogen and hydroxide ion concentrations in a solution that is $1.00x10^{-4}M$ $Ca(OH)_2$.

20. Calculate the $[H_3O^{1+}]$ concentration. 5×10^{-11} x2
21. Calculate the $[OH^{1-}]$ concentration. 2×10^{-4}
22. Is the solution acidic(A)or basic(B)? B

23-25. Determine the hydrogen and hydroxide ion concentration in a solution that is $5x10^{-3}M\ H_2CO_3$.

23. Calculate the $[H_3O^{1+}]$ concentration. $1x10^{-2}$ ×2

24. Calculate the $[OH^{1-}]$ concentration. $1x10^{-12}$

25. Is the solution acidic(A)or basic(B)? (A)

26-30. A nitric acid solution (a strong acid) is found to have a pH of 2.70. Determine each of the following:

26. Calculate the $[H_3O^{1+}]$ concentration. $10^{-pH}=[H^+]$ .002

27. Calculate the $[OH^{1-}]$ concentration. $5x10^{-12}$

28. Is the solution acidic(A)or basic(B)? (A)

(L) (M)

29. Calculate then number of moles of HNO_3 required to prepare 5.50L of this solution.

$M=\frac{mol}{L}$ $.002=\frac{mol}{5.50}$ $mol=.011$

30. The mass of the moles of HNO_3 in the solution from question #29.

$.011\ mol\ HNO_3 \times \frac{63.01g}{1\ mol} = 0.693g\ HNO_3$

31. A solution of sulfuric acid has a pH of 3.2. Calculate the concentration of sulfuric acid.

$H_2SO_4 \rightarrow 2H^+ + SO_4^{2-}$ $3.15x10^{-4}M\ H_2SO_4$

$10^{-pH}=[H^+]$ $[H^+]=6.31x10^{-4}=$

32. A solution of aluminum **hydroxide** has a pH of 10.3. Calculate the concentration of aluminum hydroxide.

$Al(OH)_3 \rightarrow Al^{3+} + 3OH^-$ $pH+pOH=14$ $pOH=3.7$

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$10^{-pOH}=[OH^-]$ $[OH^-]=2.0x10^{-4}=$ $6.65x10^{-5}M\ Al(OH)_3$

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