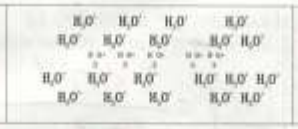
Acids and Bases Mr. Genest ChemiStry		Name ANSWERS Date

1. What is the mathematical definition of pH (give the formula)?

$pH = -\log[H^+]$ ← new yesterday

2. What two concentrations always give $1x10^{-14}$ when multiplied together?

$[H^+][OH^-] = 1 \times 10^{-14}$

3. **If the concentration of [H+] is $2.33x10^{-9}$, calculate the concentration of [OH-]**

Start by writing an appropriate formula. Circle the unknown.	Then rearrange to get the unknown alone.	Plug in the known values and solve.
$[H^+][OH^-] = 1 \times 10^{-14}$	$[OH^-] = \frac{1 \times 10^{-14}}{2.33 \times 10^{-9}}$	$[OH^-] = 4.3 \times 10^{-6}\ M$

4. If the concentration of [H+] is $7.30x10^{-4}$, calculate the concentration of [OH-]

$[H^+][OH^-] = 1.0 \times 10^{-14}$ | $[OH^-] = \frac{1.0 \times 10^{-14}}{7.30 \times 10^{-4}}$ | $[OH^-] = 1.37 \times 10^{-11}$

5. If the concentration of [H+] is $7.30x10^{-4}$, calculate the pH

$pH = -\log[H^+]$ $pH = -\log[7.30 \times 10^{-4}]$ $pH = 3.137$

6. If the concentration of [H+] is $2.33x10^{-9}$, calculate the pH

$pH = -\log[2.33 \times 10^{-9}]$ $pH = 8.633$

7. If the concentration of [OH-] is $2.33x10^{-9}$, find the [H+] and then calculate the pH (using your formula from #2 and #1)

step ① $[H^+] = \frac{1.0 \times 10^{-14}}{2.33 \times 10^{-9}}$ $[H^+] = 4.2918 \times 10^{-6}$

step ② $pH = -\log[H^+]$ $pH = -\log[4.2918 \times 10^{-6}]$

$pH = 5.37$

11. Calculate the pH of a solution if its $[OH^-] = 0.000700$ M

Start by writing an appropriate formula. Circle the unknown...

$[H^+][OH^-] = 1 \times 10^{-14}$

Then rearrange to get the unknown alone.

$[H^+] = \frac{1 \times 10^{-14}}{[OH^-]}$

Plug in the known values and solve.

$[H^+] = \frac{1.0 \times 10^{-14}}{0.000700}$

$[H^+] = 1.43 \times 10^{-11}$

Step 2

$pH = -\log[H^+]$

$pH = -\log[1.43 \times 10^{-4}]$

$pH = 10.845$

12. Calculate the pH of a 0.025 M solution of [H+]

$pH = -\log[0.025] = 1.602$

13. Circle the one compound that would turn litmus paper red.

(a) pure water
(b) 0.10 M $C_6H_{12}O_{6(aq)}$
(c) 0.10 M $NaCl_{(aq)}$
(d) 0.10 M $NaOH_{(aq)}$
(e) 0.10 M $H_2SO_{4(aq)}$

H in front means acid, acids turn LITMUS RED

14. Circle the one compound that is neither an acid nor a base.

(a) 0.10 M $C_6H_{12}O_{6(aq)}$
(b) 0.10 M $H_2CO_{3(aq)}$
(c) 0.10 M $NaOH_{(aq)}$
(d) 0.10 M $H_2SO_{4(aq)}$

15. Of the following compounds, circle ONE OR MORE that are electrolytes

(a) 0.10 M $HC_2H_3O_{2(aq)}$ — H^+
(b) 0.10 M $C_6H_{12}O_{6(aq)}$
(c) 0.10 M $NaCl_{(aq)}$ — Na^+
(d) 0.10 M $NaOH_{(aq)}$ — Na^+
(e) 0.10 M $H_2SO_{4(aq)}$ — H^+

16. Circle the compound that would increase the concentration of hydronium in solution.

(a) pure water
(b) 0.10 M $C_6H_{12}O_{6(aq)}$
(c) 0.10 M $NaCl_{(aq)}$
(d) 0.10 M $NH_{3(aq)}$
(e) 0.10 M $HNO_{3(aq)}$

17. The formula for water is H_2O. What is the formula for hydronium? H_3O^+ (include the correct charge)

18. Write the dissociation reaction for HNO_3 (for example, something that looks a little like $A_{(aq)} \rightarrow B^-_{(aq)} + C^+_{(aq)}$ or maybe $A_{(aq)} + H_2O_{(l)} \rightarrow B^+_{(aq)} + C^-_{(aq)}$.

$HNO_{3(aq)} \rightarrow H^+_{(aq)} + NO_3^-{}_{(aq)}$

19. Which one liquid below would you expect to feel slippery?

(a) pure water
(b) 0.10 M $C_6H_{12}O_{6(aq)}$
(c) 0.10 M $NaCl_{(aq)}$
(d) 0.10 M $NaOH_{(aq)}$ IT'S A BASE. BASES ARE SLIPPERY (SEE LAST WEEK'S NOTES)
(e) 0.10 M $H_2SO_{4(aq)}$

"Bases are slippery, they usually contain METAL + OH"