Name: ……………………………………… Section: ………………. Date: ……………………..

5.2 HONORS CLASS WORKSHEET – ACIDITY, ALKALINITY AND THE PH SCALE

1) Acidity and Alkalinity

The ion which makes solutions acidic is …………..

The ion which makes solutions alkaline is ………..

Water dissociates very slightly to produce H^+ and OH^- ions. Equation: ……………………………………

As a result, all aqueous solutions contain both H^+ and OH^- ions.

In pure water, the concentration of H^+ and OH^- is around ……………………….. mol/L

Any solution which contains equal concentrations of H^+ and OH^- ions is said to be …………………..

In solutions which contain acids, how will the concentrations of H^+ and OH- compare to those in pure water, and therefore to each other?

In solutions which contain alkalis, how will the concentrations of H^+ and OH- compare to those in pure water, and therefore to each other?

The product of the concentrations of H^+ and OH^- ions in a solution is always equal to 1×10^{-14}

Concentration of H^+ ions (mol/L)	Concentration of OH^- ions (mol/L)	Type of solution
0.1 (1×10^{-1})	1×10^{-13}	acidic
0.001 (1×10^{-3})		
1×10^{-5}		
1×10^{-7}		
1×10^{-9}		
1×10^{-11}		
1×10^{-13}		

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2) The pH scale

The level of acidity or alkalinity of a solution (ie the relative concentrations of H^+ and OH^- ions) is measured on a scale called the **pH scale**

The pH of a solution is defined as ……………………………………………………………………………………
(pH stands for power of hydrogen)

pH is a logarithmic scale. What does this mean?

- If the H^+ concentration is 0.1 (ie 1×10^{-1}) mol/L, the pH of the solution is 1
- If the H^+ concentration is 0.001 (ie 1×10^{-3}) mol/L, the pH of the solution is ………..
- If the H^+ concentration is 1×10^{-7} mol/L, the pH of the solution is ………..
- If the H^+ concentration is 1×10^{-11} mol/L, the pH of the solution is …………
- If the H^+ concentration is 1×10^{-13} mol/L, the pH of the solution is …………

What does a low pH tell you about the solution?

What does a high pH tell you about the solution?

The relationship between pH, acidity and alkalinity is summarised in the table below:

pH	-1	1	3	5	7	9	11	13	15
Acidity									
$[H^+]$									
$[OH^-]$									

Examples of the pH of common solutions are:

solution	pH	Solution	pH	solution	pH
1 mol/L HCl		lemon juice		vinegar	
orange juice		pure water		household bleach	
1 mol/L NaOH					