Experiment: Acids, Bases and Salts

Table 1. Theoretical pKa, pKb, pH values and theoretical % ionization of various acid, base and salt solutions, as well as their experimental pH, [H_3O^+] (M), pKa or pKb values and % ionization

#	Solutions	Theoretical pKa* or pKb*	Theoretical pH	Theoretical % ionization	Experimental pH	Experimental [H_3O^+] (M)	Experimental pKa or pKb	Experimental % ionization
ACIDS		**pKa**						
1	0.100 M HCl	-7.00	**1.000**		1 2 Ave.			
2	1.00 nM HCl	-7.00			1 2 Ave.			
3	1 M CH_3COOH	4.756			1 2 Ave.			
BASES		**pKb**						
4	0.100 M NaOH	-1.7	**13.000**		1 2 Ave.			
5	0.100 M NH_3	4.75			1 2 Ave.			
SALTS								
6	0.100 M NaCl				1 2 Ave.			
7	0.100 M CH_3COONa				1 2 Ave.			
8	0.100 M NH_4NO_3				1 2 Ave.			
9	0.100 M CH_3COONH_4				1 2 Ave.			
10	0.100 M $NaHSO_4$♥				1 2 Ave.			

♥ An example of this type of calculation is given in the textbook, sample and practice exercises 16.19, p 684 (12th edition), p 705 (13th edition).

Research Question:

Conduct some research to answer the following question!!! Make sure your reference(s) are credible. I will not accept sources that are not credible

Question: When accurate pH measurements are to be made, the solution is prepared using water that had been previously boiled and cooled in a closed container. Why? In other words, what affects the pH of solutions made from unboiled water, and that is removed upon boiling? Provide the equation.

*References
(1) Solomons TWG, Fryhle, CB. Organic Chemistry. 10th ed. John Wiley & Sons, Inc.: Hoboken, NJ; 2011. Table 3.1, Relative strength of selected acids and their conjugate bases; p. 111
(2) Weast RC, Astle MJ, Beyer, WH, editors. CRC Handbook of Chemistry and Physics. 68th ed. CRC Press, Inc.: Boca Raton, Florida; 1987