ASSIGNMENT SHEET #8 APQ ANSWERS

10 b

The solution with the highest pH is the most basic solution, which is the potassium acetate solution, $KC_2H_3O_2$, aka KAc. Recall that KAc is a salt, and you have to consider whether the cation and anion came from a strong or a weak base and acid respectively. K^+ comes from a strong base (KOH), so it does not react with water. Acetate ion, Ac^-, on the other hand, comes from a weak acid (acetic acid, CH_3COOH, or HAc), therefore it does react with water. The hydrolysis reaction between Ac- and water [Ac- + $H_2O \rightarrow$ HAc + OH^-] produces OH^-, which makes the resulting solution basic.

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a. $K_B = \dfrac{[NH_4^+] \times [OH^-]}{[NH_3]}$

b. Recall that pH + pOH = 14. Therefore, since $[OH^-] = 5.60 \times 10^{-4}$, pOH = -log 5.60×10^{-4} = 3.25
$\therefore$ pH = 14 – 3.25 = 10.75

c. Think initial, change, and @ eq concentrations. At equilibrium, $[OH^-] = [NH_4^+] = 5.60 \times 10^{-4}$ M (due to 1:1 ratio when starting with only NH_3) $[NH_3]_{eq} = 0.018 \text{ M} - 5.60 \times 10^{-4} \text{ M} = 0.01744$ M

$\therefore K_B = \dfrac{(5.60 \times 10^{-4})^2}{0.01744} = 1.8 \times 10^{-5}$

d. % ionization = $\dfrac{\Delta M}{M_{initial}} = \dfrac{5.60 \times 10^{-4}}{0.0180} \times 100 = 3.11\ \%$

28 d

Hey! Does this question look familiar? Look at 10b for the reasoning behind the answer (NaF).

65 d

Kettles are made of metal, which, over time, react with O_2 in the air to form a metal oxide, the white residue. The water of the vinegar reacts with the metal oxide to produce a base (a metal hydroxide), which in turn reacts with the acid of the vinegar (acetic acid), producing the fizzing/bubbling.