

Which solution has the highest $[\text{OH}^-]$?

1. 0.15 M NaOH
2. 0.10 M $\text{Mg}(\text{OH})_2$
3. 0.20 M NaCl
4. 0.05 M NaOH

Correct Answer: 1.

Comments to the instructor: NaCl is a neutral salt, so it does not generate any additional hydroxide in solution (only source of hydroxide is from auto-ionization of water.) NaOH is monobasic and a strong base, so it produces 1 mole of hydroxide ion in solution per mole of NaOH. $\text{Mg}(\text{OH})_2$, although dibasic, is insoluble in water ($K_{sp} = 1.8 \times 10^{-11}$) and would not dissociate completely.

Which solution has the highest $[\text{H}_3\text{O}^+]$?

1. 0.15 M NaOH
2. 0.10 M $\text{Mg}(\text{OH})_2$
3. 0.20 M NaCl
4. 0.05 M NaOH

Correct Answer: 3.

Comments to the instructor: The solution with the highest hydronium ion concentration would contain the least basic substance in this case. NaOH is a strong base, $\text{Mg}(\text{OH})_2$ is a base, although sparingly soluble, and NaCl is a neutral salt (neither basic or acidic.)

Which solution has the highest $[\text{H}_3\text{O}^+]$?

1. 0.010 M HCl
2. 0.010 M $\text{CH}_3\text{CO}_2\text{H}$
3. 0.020 M HCl
4. 0.020 M $\text{CH}_3\text{CO}_2\text{H}$

Correct answer: **3**.

Comments to the instructor: *The highest hydronium ion will be produced by the strongest acid of highest concentration (Choice 3). $\text{CH}_3\text{CO}_2\text{H}$ is a weak acid; HCl is a strong acid.*