

CHEM 1310 Review Session
Chapters 16 and 19 – Acid/Base and Electrochemistry

Chapter 16

1. Determine the $[\text{H}_3\text{O}^+]$ and pH of a 0.100M solution of benzoic acid. K_a of benzoic acid = 6.5×10^{-5}
2. A 0.485M solution of a weak acid (HA) has a pH of 3.21. Calculate the K_a .
3. What volume of 0.655M KOH solution do you need to make 4.5 L solution with pH = 11.30

Chapter 19

4. Balance each of the following redox reactions in acidic solution
 - a. $\text{SO}_3^{2-}(\text{aq}) + \text{MnO}_4^-(\text{aq}) \rightarrow \text{SO}_4^{2-}(\text{aq}) + \text{Mn}^{2+}(\text{aq})$
 - b. $\text{I}^-(\text{aq}) + \text{NO}_2^-(\text{aq}) \rightarrow \text{I}_2(\text{s}) + \text{NO}(\text{g})$
 - c. Now, balance this redox reaction in basic solution:
 $\text{Al}(\text{s}) + \text{MnO}_4^-(\text{aq}) \rightarrow \text{MnO}_2(\text{s}) + \text{Al}(\text{OH})_4^-(\text{aq})$
5. Calculate the E°_{cell} for the following reaction and determine if it is spontaneous or non-spontaneous
 - a. $\text{MnO}_2(\text{s}) + 4 \text{H}^+(\text{aq}) + \text{Zn}(\text{s}) \rightarrow \text{Mn}^{2+}(\text{aq}) + 2 \text{H}_2\text{O}(\text{l}) + 2 \text{Zn}^{2+}(\text{aq})$
 - b. $\text{Br}_2(\text{l}) + 2 \text{I}^-(\text{aq}) \rightarrow \text{I}_2(\text{s}) + 2 \text{Br}^-(\text{aq})$
 - c. $\text{O}_2(\text{g}) + 2 \text{H}_2\text{O}(\text{l}) + 4 \text{Ag}(\text{s}) \rightarrow 4 \text{OH}^-(\text{aq}) + 4 \text{Ag}^+(\text{aq})$