

CHEM 281(01) WINTER 2017. Chapter 5. HOMEWORK 8.

- 1) Which of the following reactions are redox?
- a) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$

 - b) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

 - c) $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$

 - d) $2\text{Cr} + 6\text{HCl} \rightarrow 2\text{CrCl}_3 + 3\text{H}_2$

 - e) $\text{MnO}_2 + 4\text{HBr} \rightarrow \text{Br}_2 + \text{MnBr}_2 + 2\text{H}_2\text{O}$
- 2) Separate the reduction and oxidation half reactions in following chemical equations.
- a) $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$

 - b) $\text{MnO}_2 + 4\text{HBr} \rightarrow \text{Br}_2 + \text{MnBr}_2 + 2\text{H}_2\text{O}$

 - c) $10\text{K} + 2\text{KNO}_3 \rightarrow \text{N}_2 + 6\text{K}_2\text{O}$
- 3) Balance following reactions that take place and give the sum of stoichiometric coefficients.
- a) $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{Cr}^{3+}(\text{aq}) + \text{Cl}_2(\text{g})$ (acid solution)

 - b) $\text{Br}^-(\text{aq}) + \text{MnO}_4^-(\text{aq}) \rightarrow \text{Br}_2(\text{g}) + \text{Mn}^{2+}(\text{aq})$ (acid solution)

 - c) $\text{Al}(\text{s}) + \text{MnO}_4^-(\text{aq}) \rightarrow \text{MnO}_2(\text{s}) + \text{Al}(\text{OH})_4^-(\text{aq})$ (basic solution)
- 4) Construct a Galvanic cell employing following reactions:
- a) $\text{Ni}(\text{s}) + \text{Cu}^{2+}(\text{aq}) \rightarrow \text{Ni}^{2+}(\text{aq}) + \text{Cu}(\text{s})$

 - b) $\text{Zn}(\text{s}) + 2\text{H}^+(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + \text{H}_2(\text{g})$
- 5) Using the E° values given in the table calculate the E°_{cell} for reactions in problem 4 and identify following:
- a) Two half reactions;

 - b) Anode;

 - c) Cathode;

 - d) Direction of electron flow through the external wire.

