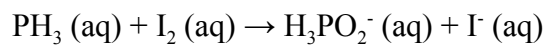


Chemistry 14B: Week 8 Workshop

UA: Kate Santoso

Q1. Consider the following unbalanced redox reaction in acidic solution:

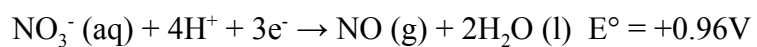


a) Write and balance the oxidation half-reaction.

b) Write and balance the reduction half-reaction.

c) Produce a balanced redox equation.

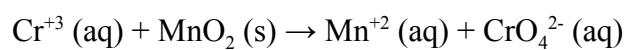
Q2. A galvanic cell is constructed utilizing the following standard cell potentials:



a) Write the balanced overall cell reaction and calculate  $E^\circ_{\text{cell}}$ .

b) Write the cell diagram (do not draw a picture).

Q3. Balance the following equation by using oxidation and reduction half-reactions. All the reactions take place in basic solution. Identify the oxidizing agent and reducing agent in the reaction.



Q4. Determine the unknown quantity in the following cell:

$\text{Pt (s)} \mid \text{H}_2 \text{ (g, 1.0 bar)} \mid \text{H}^+ \text{ (pH = ?)} \parallel \text{Cl}^- \text{ (aq, 1.0 mol/L)} \mid \text{Hg (l)} \mid \text{Hg}_2\text{Cl}_2 \text{ (s)}, E = +0.33\text{V}$

The potential of the oxidation half reaction is 0.00 V and the potential of the reduction half reaction is 0.27 V. This occurs at 25°C.

Q5. Using the information in the reduction table in the textbook, answer the following parts for the given galvanic cell:



- a) What is the standard cell potential  $E_{\text{cell}}$ , for this cell?
  
  
  
  
  
  
  
  
  
  
- b) What is the standard Gibbs free energy change,  $\Delta G^\circ$ ?
  
  
  
  
  
  
  
  
  
  
- c) Do you expect the above galvanic cell to spontaneously proceed forward, backward, or not at all in any direction?

Q6. Please rank the following species.

- a) In order of increasing reducing power going from their neutral to second oxidation state:  
Pt, Pb, Cu.
  
  
  
  
  
  
  
  
  
  
- b) In order of increasing oxidation power going from their second oxidation state to neutral:  
 $\text{Ti}^{+2}$ ,  $\text{Sn}^{+2}$ ,  $\text{Mg}^{+2}$