

Quiz: Ch 19-21, 24 (optional)  
Version I (27 pts)  
AP Chemistry

Name:  
I have not received or given, nor will give any aid on this exam.  
April 25, 2005 Period: 5 6 7

Show your work for all problems and include sensible units. No work (i.e., no reasonable justification) = no credit.

1. (18 pts) A voltaic cell is set up to run the following reaction:  $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \leftrightarrow 2 \text{HCl}(\text{g}) + 92 \text{ kJ}$

	$S^\circ$ (J/K·mol)
$\text{H}_2(\text{g})$	131
$\text{Cl}_2(\text{g})$	223
$\text{HCl}(\text{g})$	187

- a. (12 pts) Without using information on the Standard Reduction Potential table, determine  $\Delta H^\circ$ ,  $\Delta S^\circ$ ,  $\Delta G^\circ$ , and  $E_{\text{cell}}^\circ$  for this reaction at  $25^\circ\text{C}$ .

$$\Delta H^\circ =$$

$$\Delta S^\circ =$$

$$\Delta G^\circ =$$

$$E_{\text{cell}}^\circ =$$

- b. (3 pts) Considering your answers for the change in entropy and the cell potential, is this reaction likely to occur?
- c. (3 pts) Assuming that the reaction happens as written, calculate the mass of  $\text{HCl}(\text{g})$  produced if a current of 5.00 A is produced for 30 minutes.

2. (6 pts) Write the nuclear symbols (including atomic number and mass number) of the reactants and products of:
- The positron emission of yttrium-86

- The alpha decay of osmium-192

3. (3 pts) Write the net ionic equation for the complexation reaction of solutions of zinc nitrate and ammonia.