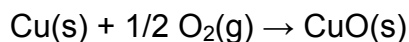


Solutions for Practice Exam 3

1. Which of the following represents an increase in entropy?

b. boiling of water

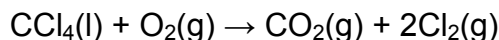
2. Calculate the standard entropy change for the following reaction,



given that $S^\circ[\text{Cu(s)}] = 33.15 \text{ J/K}\cdot\text{mol}$, $S^\circ[\text{O}_2(\text{g})] = 205.14 \text{ J/K}\cdot\text{mol}$, and $S^\circ[\text{CuO(s)}] = 42.63 \text{ J/K}\cdot\text{mol}$

d. -93.09 J/K

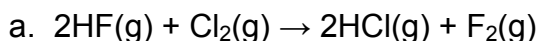
3. Calculate the standard entropy change for the following reaction,



given that $S^\circ[\text{CCl}_4(\text{l})] = 216.40 \text{ J/K}\cdot\text{mol}$, $S^\circ[\text{CO}_2(\text{g})] = 213.74 \text{ J/K}\cdot\text{mol}$, $S^\circ[\text{O}_2(\text{g})] = 205.14 \text{ J/K}\cdot\text{mol}$, and $S^\circ[\text{Cl}_2(\text{g})] = 223.07 \text{ J/K}\cdot\text{mol}$.

d. 238.34 J/K

4. In which of the following reactions do you expect to have the smallest entropy change?



5. If ΔG is positive at all temperatures, then ΔS is _____ and ΔH is _____.

b. negative, positive

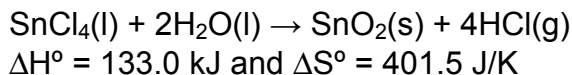
6. If ΔH and ΔS are both negative or positive, then ΔG has a _____ sign.

c. variable

7. At what temperature would a given reaction become spontaneous if $\Delta H = +119 \text{ kJ}$ and $\Delta S = +263 \text{ J/K}$?

a. 452 K

8. Given the following information, calculate ΔG° for the reaction below at 25 °C:



c. 13.4 kJ

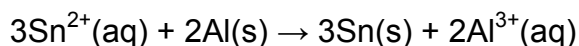
9. For the process at 25 °C $\text{I}_2(\text{g})$ to $\text{I}_2(\text{s})$, what are the signs of ΔG , ΔH , and ΔS ?

b. ΔG ΔH ΔS
- - -

10. All of the following have $\Delta G^\circ_f = 0$ **EXCEPT**

b. $\text{Br}_2(\text{g})$

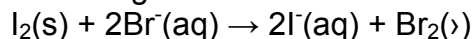
11. Consider an electrochemical cell where the following reaction takes place:



Which of the following is the correct cell notation for this cell?

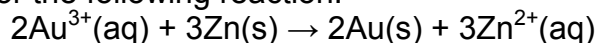
a. $\text{Al} \mid \text{Al}^{3+} \parallel \text{Sn}^{2+} \mid \text{Sn}$

12. Calculate ΔG for the following reaction:



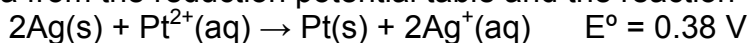
a. +105 kJ

13. Calculate ΔG for the following reaction:

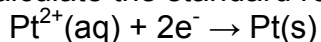


d. -1310 kJ

14. Using data from the reduction potential table and the reaction



calculate the standard reduction potential of the half-reaction

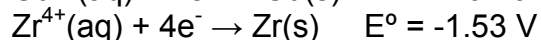


d. 1.18 V

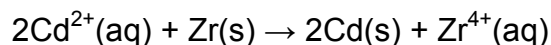
15. Using data from the reduction potential table, predict which of the following is the best reducing agent.

b. Al

16. Given the following two half-reactions

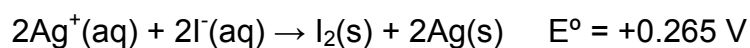


determine E° and the spontaneity of the following reaction:



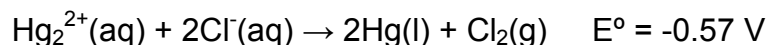
b. +1.13 V and spontaneous

17. What is the equilibrium constant for the following reaction at 298 K?



b. 9.04×10^8

18. What is the equilibrium constant for the following reaction at 37°C?



d. 2.9×10^{-19}

19. How many coulombs of charge are required to deposit 1.00 g Ag from a solution of $\text{Ag}^{+}(\text{aq})$?

c. 894

20. How much platinum would be produced by passing a 2.0 ampere current through a solution of Pt^{2+} for 30. minutes?

c. 3.6 g