

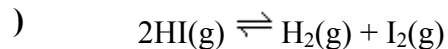
**Spring 2009 CH302 Practice Quiz 2 Prepared by DAL**

1) The osmotic pressure of 1.00 g of a polymer dissolved in benzene to give 200 mL of solution is 1.50 kPa at 25°C. Estimate the average molar mass of the polymer. The gas law constant is  $0.0821 \text{ L}\cdot\text{atm}\cdot\text{mol}^{-1}\cdot\text{K}^{-1}$ .

- A. 41 300  $\text{g}\cdot\text{mol}^{-1}$
- B. 8260  $\text{g}\cdot\text{mol}^{-1}$
- C. 693  $\text{g}\cdot\text{mol}^{-1}$
- D. 1650  $\text{g}\cdot\text{mol}^{-1}$
- E. 62 000  $\text{g}\cdot\text{mol}^{-1}$

**Answer: B**

2 Consider the reaction



At 298 K,  $K_c = 1.3 \times 10^{-3}$ , whereas at 783 K,  $K_c = 2.2 \times 10^{-2}$ . Which of the following is true?

- A. The reaction is exothermic.
- B. The reaction is endothermic.
- C. At 298 K,  $K = 3.2 \times 10^{-2}$ .
- D. At 298 K, the reaction is likely to be spontaneous.
- E. At 783 K, more HI(g) is produced.

**Answer: B**

3) At 25°C,  $\Delta G_r^\circ$  for the reaction  $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$  is  $-141.74 \text{ kJ}\cdot\text{mol}^{-1}$ . Calculate the value of  $K_c$  for this reaction.

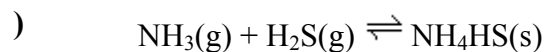
- A.  $1.74 \times 10^{26}$
- B.  $7.01 \times 10^{24}$
- C.  $2.65 \times 10^{12}$
- D.  $6.56 \times 10^{13}$

**Answer: A**

- 4) Consider the gas-phase reaction,  $2 \text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2 \text{SO}_3(\text{g})$ , for which  $K_p = 2$  at a given temperature. If the mixture is analyzed and found to contain 2.3 bar of  $\text{SO}_2$ , 4.9 bar of  $\text{O}_2$  and 7.2 bar of  $\text{SO}_3$ , describe the situation:
- A.  $Q < K$  and more reactants will be made to reach equilibrium.
  - B.  $Q < K$  and more products will be made to reach equilibrium.
  - C.  $Q > K$  and more reactants will be made to reach equilibrium.
  - D.  $Q > K$  and more products will be made to reach equilibrium.
  - E.  $Q = K$  and the reaction is at equilibrium

**Answer: E**

5 For the reaction



$K_c = 9.7$  at 900 K. If the initial concentrations of  $\text{NH}_3(\text{g})$  and  $\text{H}_2\text{S}(\text{g})$  are 2.0 M, what is the equilibrium concentration of  $\text{H}_2\text{S}(\text{g})$ ?

- A. 1.9 M
- B. 0.20 M
- C. 1.7 M
- D. 0.10 M
- E. 0.32 M

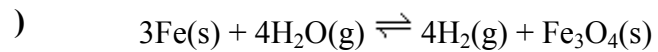
**Answer: E**

- 6) As you examine a chemical reaction to determine which compounds would you exclude from the mass expression? I) pure water II) liquid mercury III) metallic iron IV) solid NaCl
- A. I
  - B. III, IV
  - C. I, II
  - D. all of them would be excluded

- E. IV

**Answer: D**

7 Consider the reaction



If the volume of the container is reduced,

- A. the equilibrium constant increases.
- B. more  $\text{H}_2\text{(g)}$  is produced.
- C. no change occurs.
- D. more  $\text{H}_2\text{O(g)}$  is produced.
- E. more  $\text{Fe(s)}$  is produced.

**Answer: C**

8) Of the following five materials, which has the lowest freezing point and the highest boiling point?

- A. 1.5 m magnesium phosphate
- B. 2.0 m potassium chloride
- C. 1.0 m sodium chloride
- D. 1.5 m aluminum nitrate
- E. 1.5 m calcium chloride

**Answer: A**