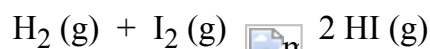
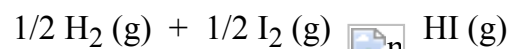
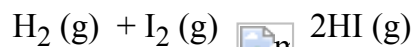


Name:**Score:** 0 / 17 points (0%) [1 open-ended question not graded]**Chapter 15 Practice Exam****Multiple Choice***Identify the choice that best completes the statement or answers the question.*___ 1. The value of K_{eq} for the equilibriumis 794 at 25°C. What is the value of K_{eq} for the equilibrium below?

- a. 397
- b. 0.035
- c. 28
- d. 1588
- e. 0.0013

ANSWER: C**POINTS:** 0 / 1

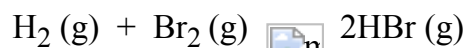
___ 2. Consider the following chemical reaction:

At equilibrium in a particular experiment, the concentrations of H_2 , I_2 , and HI were 0.023 M , 0.011 M , and 0.046 M respectively. The value of K_{eq} for this reaction is _____.

- a. 23
- b. 111
- c. 9.0×10^{-3}
- d. 6.1
- e. 61

ANSWER: E**POINTS:** 0 / 1

___ 3. At elevated temperatures, molecular hydrogen and molecular bromine react to partially form hydrogen bromide:




A mixture of 0.682 mol of H_2 and 0.440 mol of Br_2 is combined in a reaction vessel with a volume of 2.00 L. At equilibrium at 700 K, there are 0.566 mol of H_2 present. At equilibrium, there are _____ mol of Br_2 present in the reaction vessel.

- 0.000
- 0.440
- 0.566
- 0.232
- 0.324

ANSWER: E

POINTS: 0 / 1

 _____ 4. At 22°C, $K_p = 0.070$ for the equilibrium:




A sample of solid NH_4HS is placed in a closed vessel and allowed to equilibrate. Calculate the equilibrium partial pressure (atm) of ammonia, assuming that some solid NH_4HS remains.

- 0.26
- 0.070
- 0.52
- 4.9×10^{-3}
- 3.8

ANSWER: A


POINTS: 0 / 1

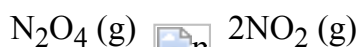
 _____ 5. Which one of the following is true concerning the Haber process?

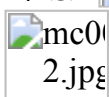
- It is a process used for shifting equilibrium positions to the right for more economical chemical synthesis of a variety of substances.
- It is a process used for the synthesis of ammonia.
- It is another way of stating LeChatelier's principle.
- It is an industrial synthesis of sodium chloride that was discovered by Karl Haber.
- It is a process for the synthesis of elemental chlorine.



ANSWER: B

POINTS: 0 / 1

 _____ 6. Which of the following expressions is the correct equilibrium-constant expression for the equilibrium between dinitrogen tetroxide and nitrogen dioxide?




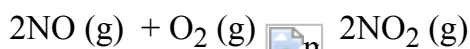
- 

- b.  3.jpg
- c.  4.jpg
- d. $[\text{NO}_2][\text{N}_2\text{O}_4]$
- e. $[\text{NO}_2]^2[\text{N}_2\text{O}_4]$

ANSWER: B

POINTS: 0 / 1


 _____ 7. Given the following reaction at equilibrium, if $K_c = 6.44 \times 10^5$ at 230.0°C , $K_p =$ _____.



- a. 3.67×10^{-2}
- b. 1.56×10^4
- c. 6.44×10^5
- d. 2.66×10^6
- e. 2.67×10^7

ANSWER: B

POINTS: 0 / 1

 _____ 8. Which of the following expressions is the correct equilibrium-constant expression for the reaction below?

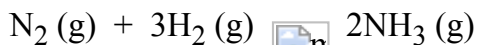


- a. $[\text{NH}_3][\text{H}_2\text{Se}] / [(\text{NH}_4)_2\text{Se}]$
- b. $[(\text{NH}_4)_2\text{Se}] / [\text{NH}_3]^2[\text{H}_2\text{Se}]$
- c. $1 / [(\text{NH}_4)_2\text{Se}]$
- d. $[\text{NH}_3]^2[\text{H}_2\text{Se}]$
- e. $[\text{NH}_3]^2[\text{H}_2\text{Se}] / [(\text{NH}_4)_2\text{Se}]$

ANSWER: D

POINTS: 0 / 1

 _____ 9. The equilibrium constant for the gas phase reaction




is $K_{\text{eq}} = 4.34 \times 10^{-3}$ at 300°C . At equilibrium, _____.

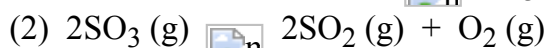
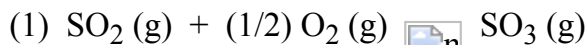
- a. products predominate
- b. reactants predominate

- c. roughly equal amounts of products and reactants are present
- d. only products are present
- e. only reactants are present

ANSWER: B

POINTS: 0 / 1

 ____ 10. The equilibrium constant for reaction 1 is K . The equilibrium constant for reaction 2 is _____.



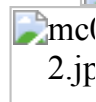




- a. K^2
- b. $2K$
- c. $1/2K$
- d. $1/K^2$
- e. $-K^2$

ANSWER: D

POINTS: 0 / 1


 ____ 11. The equilibrium expression for K_p for the reaction below is _____.

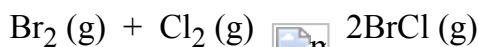


- a.  2.jp
- b.  3.jp
- c.  4.jp
- d.  5.jp
- e.  6.jp

ANSWER: E

POINTS: 0 / 1

 ____ 12. At 400 K, the equilibrium constant for the reaction




is $K_p = 7.0$. A closed vessel at 400 K is charged with 1.00 atm of $\text{Br}_2(\text{g})$, 1.00 atm of Cl_2

- (g), and 2.00 atm of BrCl (g). Use Q to determine which of the statements below is true.
- The equilibrium partial pressures of Br₂, Cl₂, and BrCl will be the same as the initial values.
 - The equilibrium partial pressure of Br₂ will be greater than 1.00 atm.
 - At equilibrium, the total pressure in the vessel will be less than the initial total pressure.
 - The equilibrium partial pressure of BrCl (g) will be greater than 2.00 atm.
 - The reaction will go to completion since there are equal amounts of Br₂ and Cl₂.


ANSWER: D

POINTS: 0 / 1

-  13. How is the reaction quotient used to determine whether a system is at equilibrium?
- The reaction quotient must be satisfied for equilibrium to be achieved.
 - At equilibrium, the reaction quotient is undefined.
 - The reaction is at equilibrium when $Q < K_{eq}$.
 - The reaction is at equilibrium when $Q > K_{eq}$.
 - The reaction is at equilibrium when $Q = K_{eq}$.

ANSWER: E

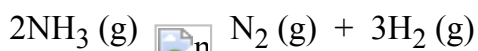
POINTS: 0 / 1

-  14. Of the following equilibria, only _____ will shift to the left in response to a decrease in volume.
- $H_2(g) + Cl_2(g) \rightleftharpoons 2 HCl(g)$
 - $2 SO_3(g) \rightleftharpoons 2 SO_2(g) + O_2(g)$
 - $N_2(g) + 3 H_2(g) \rightleftharpoons 2 NH_3(g)$
 - $4 Fe(s) + 3 O_2(g) \rightleftharpoons 2 Fe_2O_3(s)$
 - $2 HI(g) \rightleftharpoons H_2(g) + I_2(g)$

ANSWER: B

POINTS: 0 / 1

-  15. Consider the following reaction at equilibrium:



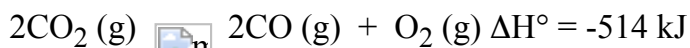
Le Châtelier's principle predicts that the moles of H₂ in the reaction container will increase with _____.

- some removal of NH₃ from the reaction vessel (V and T constant)
- a decrease in the total pressure (T constant)
- addition of some N₂ to the reaction vessel (V and T constant)
- a decrease in the total volume of the reaction vessel (T constant)
- an increase in total pressure by the addition of helium gas (V and T constant)

ANSWER: B

POINTS: 0 / 1


 16. Consider the following reaction at equilibrium:



Le Châtelier's principle predicts that an increase in temperature will _____.


- increase the partial pressure of $\text{O}_2(\text{g})$
- decrease the partial pressure of $\text{CO}_2(\text{g})$
- decrease the value of the equilibrium constant
- increase the value of the equilibrium constant
- increase the partial pressure of CO

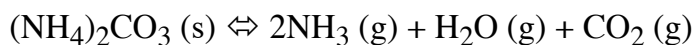
ANSWER: C**POINTS: 0 / 1**

 17. The effect of a catalyst on an equilibrium is to _____.

- increase the rate of the forward reaction only
- increase the equilibrium constant so that products are favored
- slow the reverse reaction only
- increase the rate at which equilibrium is achieved without changing the composition of the equilibrium mixture
- shift the equilibrium to the right

ANSWER: D**POINTS: 0 / 1****Short Answer**

 18. A 40.0-g sample of solid ammonium carbonate is placed in a closed, evacuated 3.00-L flask and heated to 673 K. It decomposes to produce ammonia, water, and carbon dioxide according to the equation:



The equilibrium constant, K_p , for the reaction is 0.295 M^4 at 673 K.

- Write the K_p expression for the reaction.
- Calculate K_c at 673 K.
- Calculate the partial pressure of $\text{NH}_3(\text{g})$ at equilibrium at 673 K.
- Calculate the total pressure inside the flask at equilibrium.
- Calculate the number of grams of solid ammonium carbonate in the flask at

equilibrium.

f. What is the minimum mass of solid $(\text{NH}_4)_2\text{CO}_3$ that is necessary to be placed in the flask in order for the system to reach equilibrium?

RESPONSE:

ANSWER:

- a. $K_p = P_{\text{NH}_3}^2 P_{\text{H}_2\text{O}} P_{\text{CO}_2}$
- b. 3.17×10^{-8}
- c. 1.04 atm
- d. 2.08 atm
- e. 37.3 g
- f. >2.72 g

POINTS: -- / 1

