Q1501 EQ KEY #_____ Dr. Duick

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The pressure in a 12.2 L vessel that contains 2.34 g of carbon dioxide, 1.73 g of sulfur dioxide, and 3.33 g of argon, all at 42 °C is _____ mm Hg. 1) E
A) 0.347 B) 116 C) 134 D) 395 E) 263

2) SO_2 (5.00 g) and CO_2 (5.00 g) were placed in a 750.0 mL container at 50.0 °C. The partial pressure of CO_2 in the container was _____ atm. 2) F
A) 0.192 B) 2.76 C) 1.60 D) 6.78 E) 4.02

3) At equilibrium, _____. 3) A
A) the rates of the forward and reverse reactions are equal
B) the rate constants of the forward and reverse reactions are equal
C) all chemical reactions have ceased
D) the value of the equilibrium constant is 1
E) the limiting reagent has been consumed

4) Which one of the following is true concerning the Haber process? 4) D
A) It is a process used for shifting equilibrium positions to the right for more economical chemical synthesis of a variety of substances.
B) It is another way of stating Le Châtelier's principle.
C) It is an industrial synthesis of sodium chloride that was discovered by Karl Haber.
D) It is a process used for the synthesis of ammonia.
E) It is a process for the synthesis of elemental chlorine.

$3H_2 + N_2 \rightarrow 2NH_3$

5) Which one of the following will change the value of an equilibrium constant? 5) B
A) varying the initial concentrations of reactants
B) changing temperature
C) adding other substances that do not react with any of the species involved in the equilibrium
D) varying the initial concentrations of products
E) changing the volume of the reaction vessel

Only Temp Changes K Values → $\frac{K_f}{K_r} = K_c$

SO_2 CO_2
5 3 = 64 44
O_2 32

$\frac{5}{64} = 0.078125\ SO_2$
$0.1136\ CO_2$

#2
$PV = nRT$
$P(0.750) = 0.1136\ CO_2\ (0.08206)(323) = 4.02$

#1
$PV = nRT$ (12.2 L; R = 0.08206 Atm mol^{-1} K^{-1}; T = 315 K)
$CO_2 = 2.34/44 = 0.053$
$SO_2 = 1.73/64 = 0.027$
$Ar = 3.33/40 = 0.083$
0.16325
$0.345\ Atm \frac{760\ mm}{Atm} = 263\ mm$

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

$N_2O_4\,(g) \rightleftharpoons 2NO_2\,(g)$

A) $\frac{[NO_2]}{[N_2O_4]}$

B) $\frac{[NO_2]}{[N_2O_4]^2}$

C) $[NO_2]^2[N_2O_4]$

D) $\frac{[NO_2]^2}{[N_2O_4]}$

E) $[NO_2][N_2O_4]$

7) The ~~equilibrium-constant~~ expression depends on the _____ of the reaction. 7) A

A) stoichiometry

B) ~~the quantities of reactants and products initially present~~

C) stoichiometry and mechanism

D) mechanism

E) temperature

8) The equilibrium expression for K_p for the reaction below is _____. 8) B

$2O_3\,(g) \rightleftharpoons 3O_2\,(g)$

A) $\frac{2P_{O_3}}{3P_{O_2}}$ B) $\frac{P_{O_2}^3}{P_{O_3}^2}$ C) $\frac{3P_{O_2}}{2P_{O_3}}$ D) $\frac{3P_{O_3}}{2P_{O_2}}$ E) $\frac{P_{O_3}^2}{P_{O_2}^2}$

9) Which of the following expressions is the correct equilibrium-constant expression for the following 9) B
reaction?

$CO_2\,(g) + 2H_2\,(g) \rightleftharpoons CH_3OH\,(g)$

A) $\frac{[CO_2][H_2]^2}{[CH_3OH}$

B) $\frac{[CH_3OH]}{[CO_2][H_2]^2}$

C) $\frac{[CH_3OH]}{[CO_2]}$

D) $\frac{[CO_2][H_2]}{[CH_3OH}$

E) $\frac{[CH_3OH]}{[CO_2][H_2]}$