حلول

Chapter 5

1) The molality of a solution is defined as

A) Moles of solute per liter of solution.

B) Grams of solute per liter of solution.

C) Moles of solute per kilogram of solution.

(D) Moles of solute per kilogram of solvent.

E) The gram molecular weight of solute per kilogram of solvent.

2) What is the molarity of an NaI solution that contains 3.00 g of NaI in 40.0 mL of solution?(Na = 23 g and I = 126.9 g)

A) 0.100 M

C) 1.00 M

(B) 0.500 M

D) 2.00 M

E) 5.00 M

3) What is the mass of $C_{12}H_{22}O_{11}$ in 60.0 mL of 0.0880 *M* solution?

(C = 12 g, O = 16 g and H =1 g)

A) 0.181 g

C) 5.02 g

(B) 1.81 g

D) 5.28 g

4) The molarity of a solution is defined as

(A) Moles of solute per liter of solution.

B) Grams of solute per liter of solution.

C) Moles of solute per kilogram of solution.

D) Moles of solute per kilogram of solvent.

E) The gram molecular weight of solute per kilogram of solvent

5) Calculate the molality of a solution containing 14.3 g of NaCl in 42.2 g of water.
(Na = 23 and Cl = 35.4 g)

A) 2.45×10^{-4} m B) 5.80×10^{-4} m C) 2.45×10^{-1} m D) 103 m

E) 5.80 m

(1) $n = \frac{mg}{Mm} = \frac{14.3}{23+35}$

$n =$

(2) $m = \frac{n}{kg} = \frac{}{42 \times 10^{-3}}$

6) This equation is unbalanced: $2C_2H_6 + 7O_2 \text{------} 4CO_2 + 6H_2O$

When it is correctly balanced, the coefficients are, respectively

A) 2,3,4,1

B) 4,9,1,3

C) 2,7,4,6

D) 2,3,2,3

7) What is the coefficient for CO_2 when the following chemical equation is properly balanced using the smallest set of whole numbers?

$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

A) 1

B) 4

E) 12

C) 6

D) 8

8) When it is correctly balanced, the correct coefficients for the equation below are

$PCl_3 + 3H_2O \text{----} > H_3PO_3 + 3HCl$

A) 1, 3, 1, 1

B) 1, 3, 1, 3

C) 1, 1, 1, 3

D) 2, 3, 2, 3

9) What volume (L) of 3.0 M (M) NaOH can be prepared using exactly 96.0 g of NaOH?

(Na = 23 g , O = 16 g and H = 1 g)

A) 0.14 L

B) 0.70 L

C) 0.80 L

D) 1.25 L

$V_b = \frac{n}{M}$

[1] $= n = \frac{m \cdot g}{Mw} = \frac{96}{40}$

$n = 2.4$

[2] $V = \frac{n}{M} = \frac{2.4}{3}$

$V = 0.8$

10) Generally, aqueous acid-base reactions produce

A) Salt and H_2O

B) Acid and H_2O

C) metal and H_2O

D) Base and H_2O

11) What are the products produced when Mg(OH)2 reacts with H3PO4?

A) $Mg_3(PO_4)_2$ and $H_3(OH)_2$

B) No reaction occurs

C) $(OH)_3PO_4$ and HMg

D) $Mg_3(PO_4)_2$ and H_2O

اصول متزدوج

12) Which of the following reactions is acid – base reaction

A) $HCN\ (aq) + NaOH\ (aq) \rightarrow NaCN\ (aq) + H_2O(l)$

B) $Pb(NO_3)_2\ (aq) + 2KI\ (aq) \rightarrow PbI_2\ (s) + 2KNO_3\ (aq)$

C) $2Mg\ (s) + O_2\ (g) \rightarrow 2MgO\ (s)$

D) $H_2\ (g) + Cl_2\ (g) \rightarrow 2HCl\ (g)$

13) Which of the following reactions is kind of precipitation Reaction

A) $HCN\ (aq) + NaOH\ (aq) \rightarrow NaCN\ (aq) + H_2O(l)$

B) $Pb(NO_3)_2\ (aq) + 2KI\ (aq) \rightarrow PbI_2\ (s) + 2KNO_3\ (aq)$

C) $2Mg\ (s) + O_2\ (g) \rightarrow 2MgO\ (s)$

D) $H_2\ (g) + Cl_2\ (g) \rightarrow 2HCl\ (g)$

التركيب لازم يعطينا

محلول + صلب

Chapter 6

14) Which of the following is true for a chemical reaction at equilibrium?

A) Only the forward reaction stops

B) Only the reverse reaction stops

C) The rate constants for the forward and reverse reactions are equal

(D) The rates of the forward and reverse reactions are equal

or backword

15) A chemical equilibrium may be established by starting a reaction with

A) Reactants only.

B) Products only.

C) Equal quantities of reactants and products.

(D) Any quantities of reactants and products.

E) All the above

16) An equilibrium that strongly favors products has _____

A) a value of $K << 1$.

(B) a value of $K >> 1$.

C) a value of $Q >> 1$.

D) a value of $Q << 1$.

E) $K = Q$.

17) How is the reaction quotient used to determine whether a system is at equilibrium?

Q

A) When $Q < Keq$.

B) When $Q > Keq$.

C) When $Q = 0$

(D) When $Q = Keq$.

18) If the reaction quotient Q has a smaller value than the related equilibrium constant, Keq _____

A) The reaction is at equilibrium.

(B) The reaction needs more products to reach equilibrium.

C) The reaction needs more reactants to reach equilibrium.

D) The value of K will decrease until it is equal to Q.

19) Which of the following occurs when products are added to a chemical reaction at equilibrium?

A) Q increases, so the equilibrium shifts to produce more products.

B) Q increases, so the equilibrium shifts to produce more reactants.

C) Q decreases, so the equilibrium shifts to produce more products.

D) Q decreases, so the equilibrium shifts to produce more reactants.

20) The conventional equilibrium constant expression (K_c) for the system below is:

$2ICl\ (s) \leftrightarrow I_2\ (s) + Cl_2\ (g)$

A) $[I_2]\ [Cl_2]/[ICl]^2$

B) $[I_2]\ [Cl_2]/2[ICl]$

C) $[Cl_2]$

D) $([I_2] + [Cl_2])/2[ICl]$

E) $[Cl_2]/[ICl]^2$

21) If Keq for the reaction $2\ NH_3\ (g) \rightarrow N_2\ (g) + 3\ H_2\ (g)$ is 3×10^{-3} at some temperature. What is Keq for the reaction $0.5\ N_2\ (g) + 1.5\ H_2\ (g) \leftrightarrow NH_3\ (g)$ at the same temperature?

A) 0.003

B) 0.05

C) 18

D) 20

22) The Keq for the equilibrium below is 7.52×10^{-2} at 48 °C.

$2Cl_2\ (g) + 2H_2O\ (g) \leftrightarrow 4HCl\ (g) + O_2\ (g)$

What is the value of Keq at this temperature for the following reaction?

$Cl_2\ (g) + H_2O\ (g) \leftrightarrow 2HCl\ (g) + \frac{1}{2}\ O_2\ (g)$

A) 0.150 B) 0.274 C) 0.0376 D) 5.66×10^{-3} E) 0.0752

23) The following equilibrium is readily established:

$SO_2Cl_2\,(g) \leftrightarrow SO_2\,(g) + Cl_2\,(g)$

At equilibrium at 373 K, a 1.00-L reaction vessel contains 0.0106 mol of SO_2Cl_2 and 0.0287 mol each of SO_2 and Cl_2. What is Keq for the reaction at 373 K?

A) 12.8 B) 2.72 C) 0.078 D) 2.39

24) The Keq for the reation below is 1.49×10^8 at 100°C:

$CO\,(g) + Cl_2\,(g) \leftrightarrow COCl_2\,(g)$

In an equilibrium mixture of the three gases, $PCO = PCl_2 = 8.60\times10^{-4}$ atm. The partial pressure of the product, phosgene ($COCl_2$), is _____ atm.

A) 2.01×10^{14} B) 1.72×10^{11} C) 1.28×10^{5} D) 4.96×10^{-15}

E) 1.10×10^{2}

25) The value of K_c at 227°C is 0.0952 for the following reaction:

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

What is K_p at this temperature?

A) 1.6×10^{2} C) – 1600

B) 3.22×10^{3} D) 1.2500

26) Consider the following equilibrium at 295 K:

$NH_4HS\,(s) \rightleftharpoons NH_3\,(g) + H_2S\,(g)$

The partial pressure of each gas is 0.265 atm. what is the value of K_c for the reaction?

A) 2.35×10^{-2} C) 1.20×10^{-4}

B) 4.24×10^{-3} D) -2.35

27) The following reaction $3ClO^-(aq) \leftrightarrow ClO_3^-(aq) + 2Cl^-(aq)$ has $K_c = 3.2 \times 10^3$. If $[Cl^-] = 0.50$ mol/L; $[ClO_3^-] = 0.32$ mol/L; $[ClO^-] = 0.24$ mol/L. Is the mixture at equilibrium and, if not, in which direction will reaction proceed?

A) The system is at equilibrium.

B) The system is not at equilibrium; reaction will proceed left to right.

C) The system is not at equilibrium; reaction will proceed right to left.

E) There is not enough information to tell.

28) Consider the following reaction in the gas phase: $H_2 + I_2 \leftrightarrow 2HI$

If the pressure increased by reducing the volume of the flask,

A) More HI will be produced.

B) More H_2 and I_2 will be produced.

C) The equilibrium constant will change

D) The amount of HI will remain the same.

29) Consider the following reaction at equilibrium:

$2CO_2(g) \leftrightarrow 2CO(g) + O_2(g)$ $\Delta H° = -514$ kJ

Le Cha telier's principle predicts that adding $O_2(g)$ to the reaction container will

A) Decrease the partial pressure of CO_2 (g) at equilibrium

B) Decrease the value of the equilibrium constant

C) Increase the partial pressure of CO_2 (g) at equilibrium

D) Increase the value of the equilibrium constant

E) Increase the partial pressure of CO (g) at equilibrium

30) Consider the gas-phase equilibrium system represented by the equation:

$2H_2O\,(g) \leftrightarrow 2H_2\,(g) + O_2(g)$

Given that the above reaction is **endothermic**, which of the following changes will **decrease** the equilibrium amount of H_2O?

A) Adding more oxygen

B) Adding a solid phase catalyst

C) Decreasing the volume of the container (the total pressure increases)

(D) Increasing the temperature at constant pressure

31) Consider the following reaction at equilibrium:

$2CO_2\,(g) \leftrightarrow 2CO\,(g) + O_2\,(g)$ $\Delta H° = -514$ kJ

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

A) Increase the partial pressure of O_2 (g)

(B) Decrease the value of the equilibrium constant

C) Increase the partial pressure of CO

D) Decrease the partial pressure of CO_2 (g)

E) Increase the value of the equilibrium constant

32) Consider the following reaction at equilibrium.

$2CO_2\,(g) \leftrightarrow 2CO\,(g) + O_2\,(g)$ $\Delta H° = -514$ kJ

Le Cha telier's principle predicts that the equilibrium partial pressure of CO (g) can be maximized by carrying out the reaction _____.

A) At high temperature and high pressure

B) At high temperature and low pressure

(C) At low temperature and low pressure

D) At low temperature and high pressure

E) In the presence of solid carbon

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

A) Increase the rate at which equilibrium is achieved without changing the composition of the equilibrium mixture

B) Increase the rate of the forward reaction only

C) Shift the equilibrium to the right

D) Increase the equilibrium constant so that products are favored

E) Slow the reverse reaction only

34. → [illegible]

Chapter 7

1) Consider the following acid-base equilibrium:

$HCO_3^- + H_2O \leftrightarrow H_2CO_3 + OH^-$

In the reaction above, the Brönsted-Lowry acids are

A) H_2O and OH^-

B) HCO_3^- and OH^-

C) H_2O and H_2CO_3

D) HCO_3^- and H_2CO_3

2) In which of the following reactions is water behaving as a Brønsted-Lowry acid?

A) $2H_2O \leftrightarrow 2H_2 + O_2$

B) $HCl + H_2O \leftrightarrow H_3O^+ + Cl^-$

C) $NH_3 + H_2O \leftrightarrow NH_4^+ + OH^-$

D) $NH_4^+ + H_2O \leftrightarrow H_3O^+ + NH_3$

3) An Arrhenius acid is defined as a chemical species that

A) Is a proton donor.

B) Is a proton acceptor.

C) Produces hydrogen ions in solution.

D) Produces hydroxide ions in solution.

4) A substance which produces hydroxide ions in solution is a definition of which of the following?

A) An Arrhenius acid

B) An Arrhenius base

C) A Bronsted-Lowry acid

D) A Bronsted-Lowry base

5) Consider the following equilibrium at 25°C:

$2H_2O\ (l) \rightleftarrows H_3O^+\ (aq) + OH^-\ (aq)$

What happens to $[OH^-]$ and pH as 0.1M HCl is added?

A) $[OH^-]$ decreases and pH increases.

B) $[OH^-]$ decreases and pH decrease.

C) $[OH^-]$ increases and pH increases.

D) $[OH^-]$ increases and pH decreases.

6) What changes occur to $[H_3O^+]$ and pH when NaOH is added?

A) $[H_3O^+]$ increases and pH increases.

B) $[H_3O^+]$ increases and pH decreases.

C) $[H_3O^+]$ decreases and pH increases.

D) $[H_3O^+]$ decrease and pH decreases

7) In an acidic solution at 25°C,

A) $[H_3O^+] < [OH^-]$ and $pH > 7$

B) $[H_3O^+] < [OH^-]$ and $pH < 7$

C) $[H_3O^+] > [OH^-]$ and $pH > 7$

D) $[H_3O^+] > [OH^-]$ and $pH < 7$

8) Consider the following equilibrium:

$2H_2O + \text{energy} \leftrightarrow H_3O^+ + OH^-$ In pure water at a temperature of 50°C,

A) $pH < 7$

B) $pH + pOH = 14$

C) $K_w = 1.0 \times 10^{-14}$

D) $[OH^-] < 1.0 \times 10^{-7}$

9) A solution in which $[H^+] = 10^{-8}$ M has a pH of ___ and is ___.

A) 8, acidic
C) -6, basic
B) 6, basic
D) -8, neutral
E) 8, basic

pH

10) Which of the following is a definition of pKw?

A) pKw = -log Kw
B) pKw = pH – pOH
C) pKw = 7.0 at 25°C
D) pKw = $[H_3O^+]$ $[OH^-]$

11) Consider the following equilibrium:

$2H_2O$ (l) + energy ↔ H_3O^+ (aq) + OH^- (aq)

What will cause the pH to increase and the Kw to decrease?

A) Adding a strong acid
B) Adding a strong base
C) Increasing the temperature
D) Decreasing the temperature

12) The pH of a solution changes from 3.00 to 6.00. By what factor does the $[H_3O^+]$ change?

A) 2
C) 100
B) 3
D) 1000

13) If K_w is 2.9×10^{-15} at 10°C, what is the pH of pure water at 10°C?

A) 6.72
B) 7.00
C) 7.27
D) 7.53

14) If the pH is 6, what is the concentration of hydrogen ion?

A) 10^{-7} M B) 10^{-14} M C) 10^{-8} M D) 10^{-6} M E) 10^{-1} M

15) The $[OH^-]$ in a solution of pH 3.00 is

A) 1.0×10^{-11} M
B) 1.0×10^{-9} M
C) 1.0×10^{-6} M
D) 1.0×10^{-3} M

16) If the hydroxide ion concentration is 10^{-10} M, what is the pH of the solution?

A) 4 B) 1 C) 10 D) 7 E) 14

17) Calculate the pOH of a 0.050 M HBr solution.

A) 0.30
B) 1.30
C) 12.70
D) 13.70

18) The pH of a 0.10M KOH solution is

A) 0.10
B) 1.00
C) 13.00
D) 14.0

19) The pH of a 0.02 M solution of an unknown weak acid is 3.7. What is the pK_a of this acid?

A) 5.7
B) 4.9
C) 3.2
D) 2.8
E) 3.7

20) What is the pH of a solution prepared from 0.250 mol of NH_3 dissolved in sufficient water to make 1.00 L of solution? (Kb = 1.8 x 10-5)

A) 2.12
B) 2.67
C) 8.92
D) 11.33
E) 13.40

Chapter 8

1) A process that absorbs heat from surrounding is a (n) _____ process.

A) Ectothermic B) exothermic C) polythermic D) endothermic

2) Which one of the following quantities is not a state function?

A) Enthalpy B) Work C) Entropy D) Gibbs free energy

3) Which of the following is not a state function?

A) ΔE B) ΔH C) q D) P E) V

4) Δ H = q at

A) Constant T B) constant P C) Δ H° = 0 D) Δ E = 0

5) The reaction will be exothermic when

A) Δ H = 0 B) Δ H > 0 C) Δ H < 0 D) $q_p > 0$

6) Given: $2\ Fe\ (s) + 3\ O_2\ (g) \rightarrow 2\ Fe_2O_3\ (s)$ $\Delta H^o = -789$ kJ

The reaction shown above is _____ and therefore heat is _____ by the reaction.

A) Exothermic, released
B) Endothermic, absorbed
C) Endothermic, released
D) Exothermic, absorbed

7) Which one of the following processes is exothermic?

A) $H_2\ (l) \rightarrow H_2\ (g)$

B) $CO_2\ (s) \rightarrow CO_2\ (g)$

C) $H_2O\ (g) \rightarrow H_2O\ (l)$

D) $H_2\ (g) \rightarrow 2H\ (g)$

8) When you make ice cubes:

A) It is an endothermic process.

B) It is an exothermic process.

C) The heat of vaporization must be removed.

D) The process is referred to scientifically as sublimation.

E) None of the above

9) What is the enthalpy change when 225 g of C_2H_2 are burned in excess O_2?

[C=12, H=1]

$C_2H_2\ (g) + 5/2\ O_2\ (g) \rightarrow 2CO_2\ (g) + H_2O\ (l)$ $\Delta H^o = -1300$ kJ

A) -1.1×10^4 kJ
B) -3.39×10^4 kJ
C) -2.93×10^5 kJ
D) $+1.1 \times 10^4$ kJ
E) $+2.93 \times 10^5$ kJ

10) The value of $\Delta H°$ for the following reaction is –6535 kJ. How many kJ of heat will be evolved during the combustion of 16.0 g of C_6H_6 (l)?

$2\ C_6H_6\ (l) + 15\ O_2\ (g) \rightarrow 12\ CO_2\ (g) + 6\ H_2O\ (l)\ \Delta H° = -6535\ kJ$

A) 2.68×10^3

B) 5.23×10^4

C) 670 (C) = -670 / 20 g

D) 1.34×10^3

E) 6535

11) $\Delta H°$ for the reaction $2\ N_2\ (g) + 6H_2\ (g) \rightarrow 4NH_3\ (g)$ is –184.8 kJ.

What is $\Delta H°$ for the reaction $2\ NH_3\ (g) \rightarrow N_2\ (g) + 3H_2\ (g)$? عكس ضرب ½

A) + 92.4 kJ B) - 92.4 kJ C) +184.8 kJ D) +369.6 kJ

12) Given: $2\ Al\ (s) + 3/2\ O_2\ (g) \rightarrow Al_2O_3\ (s)$ $\Delta H° = -1670$ kJ

What is $\Delta H°$ for the reaction? عكس وضرب ٢

$2\ Al_2O_3\ (s) \rightarrow 4\ Al\ (s) + 3\ O_2\ (g)$ $\Delta H° = ?$

A) –3340 kJ

B) +1670 kJ

C) +3340 kJ

D) –1670 kJ

E) –835 kJ

13) For which of the substances below is $\Delta H°_f = 0$?

A) O_2 (g)

B) C (graphite) } = 0

C) N_2 (l)

D) C (diamond)

E) A and B

14) The symbol ΔH_f^o [HNO_3 (l)] refers to which one of the following reactions occurring at 25 °C?

A) HNO_3 (l) → H (g) + N_2 (g) + O_3 (g)

B) ½ H_2 (g) + ½ N_2 (g) + 3/2 O_2 (g) → HNO_3 (l)

C) H (g) + N_2 (g) + O_3 (g) → HNO_3 (l)

D) HNO_3 (l) → ½ H_2 (g) + ½ N_2 (g) + 3/2 O_2 (g)

E) H_2 (g) + N_2 (g) + O_3 (g) → HNO_3 (l)

15) To which of the following reactions occurring at 25 °C does the symbol ΔH_f^o [H2O (l)] apply?

A) H_2O (l) ----> 2 H (g) + O (g)

B) 2 H (g) + O (g) ----> H_2O (l)

C) H_2 (l) + ½O_2 (l) ----> H_2O (l)

D) H_2 (g) + ½O_2 (g) ----> H_2O (l)

E) H_2O (g) ----> H_2O (l)

16) calculate the value of ΔH^o_{rxn} (in kJ) for the following reaction:

4 NH_3 (g) + 5 O_2 (g) → 4 NO (g) + 6 H_2O (l)

Given the following ΔH_f^o values: H_2O (l) = –286 kJ/mol, NO (g) = +90 kJ/mol, NH_3 (g) = –46 kJ/mol.

A) –242 kJ

B) –150 kJ

C) –1540 kJ

D) –1172 kJ

E) –1892 kJ

17) Calculate the standard heat of formation ΔH_f^o for FeS_2(s), given the following information: $2FeS_2(s) + 5O_2(g) \rightarrow 2FeO(s) + 4SO_2(g)$

ΔH^o_{rxn} = -1370 kJ, ΔH_f^o for SO_2 (g) = -297 kJ, ΔH_f^o for FeO(s) = -268 kJ

A) -177 kJ

B) -1550 kJ

C) -774 kJ

D) -686 kJ

E) +808 kJ

18) Calculate the standard heat of formation of carbon disulfide (CS_2) from its elements, given that:

$C(s) + O_2(g) \longrightarrow CO_2(g)$ $\Delta H_f^\circ = -393.5$ kJ

$S(s) + O_2(g) \longrightarrow SO_2(g)$ $\Delta H_f^\circ = -296.8$ kJ

$CS_2(l) + 3\,O_2(g) \longrightarrow CO_2(g) + 2\,SO_2(g)$ $\Delta H^\circ_{rxn} = -1076.8$ kJ

A) -1767.1 kJ

B) -386.5 kJ

C) 89.7 kJ

D) 386.5 kJ

19) Calculate the enthalpy of the following reaction: $N_2(g) + 2O_2(g) \rightarrow 2NO_2(g)$ using the following reactions

$N_2(g) + O_2(g) \rightarrow 2NO(g)$ $\Delta H = 180$ kJ

$2NO(g) + O_2(g) \rightarrow 2NO_2(g)$ $\Delta H = -112$ kJ

$N_2 + 2O_2 \rightarrow 2NO_2$

A) $\Delta H = +68$ kJ B) $\Delta H = 292$ kJ C) $\Delta H = 98$ kJ D) $\Delta H = 66$ kJ

20) Data: $2\,Ba(s) + O_2(g) \rightarrow 2BaO(s)$ $\Delta H^\circ = -1107.0$ kJ

$Ba(s) + CO_2(g) + \frac{1}{2}O_2(g) \rightarrow BaCO_3(s)$ $\Delta H^\circ = -822.5$ kJ

Given the data above, calculate ΔH° for the reaction below

$BaCO_3(s) \rightarrow BaO(s) + CO_2(g)$

$\Delta H = (-1107 \times 0.5) + 822.5$

A) -1929.5 kJ B) -1376.0 kJ C) -284.5 kJ D) 269.0 kJ E) 537 kJ

Chapter 9

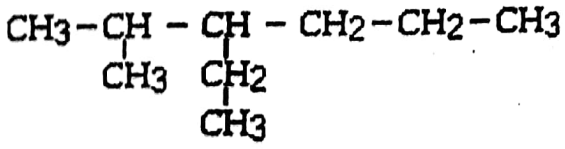
1) Hydrocarbons containing only single bonds between the carbon atoms are called

A) Alkenes B) alkynes C) aromatics D) alkanes E) ketones

2) An alkane with seven carbon atoms in a linear configuration is called a

A) hexene B) heptene C) hepylane D) heptane E) hexane

3) Name the following compound:



A) 2-methyl-3-propylpentane

B) 2-methyl-3-ethylhexane

C) 4-methyl-3-propylpentane

D) 4-ethyl-5-methylhexane

E) 3-ethyl-2-methylhexane

4) Hydrocarbons containing carbon-carbon triple bonds are called _____.

A) alkanes B) aromatic hydrocarbons C) alkynes D) alkenes E) olefins

5) Which of these compounds is an organic substance?

A) CaO B) H_2O C) PF_3 D) CCl_4 E) $CuCl_2$

6) Which of these is not an alkane?

A) C_3H_8 B) CH_4 C) C_2H_2 D) C_6H_{14} E) C_4H_{10}

7) Which of these is the correct name for $CH_3(CH_2)_4CH_3$?

A) Butane B) octane C) hexane D) nonane E) heptane

8) How many carbon atoms are there in a molecule of hexane?

A) 4 B) 5 C) 6 D) 7 E) 8

9) How many hydrogen atoms are there in a molecule of hexane?

A) 10 B) 11 C) 12 D) 13 E) 14

10) If an alkane undergoes a reaction to become an alkene, the newly formed alkene will most likely contain _____ hydrogen atom(s) than the original alkane.

A) One more B) two more C) one fewer D) two fewer

11) Which of the following statements is not true about the named hydrocarbon?

4-ethyl-3, 5-dimethyloctane

A) A methyl group branches from position 5

B) An ethyl group branches from position 4.

C) There eight carbon atoms in the longest chain.

D) An ethyl group branches from position 3.

12) $CH_4 + O_2 =$? What reaction occurs when the above chemicals react?

A) Substitution

B) Addition

C) Elimination

D) Combustion

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

A) Increase the rate at which equilibrium is achieved without changing the composition of the equilibrium mixture

B) Increase the rate of the forward reaction only

C) Shift the equilibrium to the right

D) Increase the equilibrium constant so that products are favored

E) Slow the reverse reaction only

34) Increasing the temperature of an exothermic reaction results in _____

A) More products and fewer reactants.

B) More reactants and fewer products.

C) More reactants and products.

D) Fewer reactants and products.

E) No change in the quantities of reactants and products.

35) Given the following reaction at equilibrium, which of the following alterations will increase the amount (in moles) of SO_2Cl_2:

$SO_2\ (g) + Cl_2\ (g) \leftrightarrow SO_2Cl_2\ (g)$ $\Delta H° = -67$ kJ

A) Adding heat to the system

B) Adding Cl_2 to the system.

C) Removing Cl_2 from the system.

D) Increasing the volume of the reaction vessel.

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