#4 - SELF-ASSESS: Practice Quiz to See What You Remember

Turned in Monday of the 2nd Week of School!

Directions

1. **Print this document.** See Summer Assignment Cover Sheet for a tip on printing double sided if your printer doesn't do it automatically!
2. Using **ONLY** a periodic table and a non-graphing scientific calculator, complete the following questions. Do NOT peek at the internet, your Honors Chem notes, etc. See what you *actually* remember from Honors Chem!
3. **USE BINDER PAPER FOR ALL MATH PROBLEMS! STAPLE TO THE BACK OF THIS DOCUMENT!**
4. Once you have completed the questions, use the answer key at the end to check your work. Use a **GREEN PEN** to show your corrections.
5. For each topic, **WRITE DOWN** how many you got correct in the box for that topic.
6. Use the **"REVIEW TASK CHECKLIST"** to determine what review work needs to be completed for each of the topics. The class website will have what you need to do the tasks. **www.mychemistryclass.net**
7. Use the **"Evidence of Self Study"** paper to show proof that you did the tasks. Show me **EVERYTHING** you did to review and get caught up!
8. **BE HONEST**…don't say you did better than you actually did to get out of doing the review work. You should WANT to do anything and everything possible to enter AP Chemistry on a strong foot. Cutting corners now will only cause you to struggle later! Make a grownup decision to set yourself up for success. Show me you can do that.

Name: **Period:** **Seat #:**

Review Task Checklist

# Correct	Review Tasks to Accomplish	Some Useful Links to Help with Review Tasks
4 out of 4	• Skim through the corresponding lecture PDF • Jot down a few reminders about the topic	• General class website: www.mychemistryclass.net • Honors tab on class website: http://mychemistryclass.net/honorschem.html • PDFs of Lectures: http://mychemistryclass.net/HCtableofcontents.html • YouTube Links: at the end of the Lecture PDFs or on YouTube Channel directly if that is easier: https://tinyurl.com/yc23pjmb • Packets of Worksheet problems from Honors Chemistry: http://mychemistryclass.net/HColdrainbowpackets.html • OpenStax Textbook: https://tinyurl.com/5a8krxc4 CK-12 Textbook: https://tinyurl.com/5a8krxc4
3 out of 4	• Skim through the corresponding lecture PDF • Jot down a few reminders about the topic • Find and do 3 practice problems (from Honors Chem Worksheets, the internet, textbook, etc)	
2 out of 4	• Watch the corresponding YouTube lecture video(s) • Jot down some notes from the video • Do 3 practice problems (from Honors Chem Worksheets, the internet, textbook, etc)	
1 out of 4	• Watch the corresponding YouTube lecture video(s) • Jot down some notes • Do 5 practice problems (from Honors Chem Worksheets, the internet, textbook, etc)	
0 out of 4	• Watch the corresponding YouTube lecture video(s) • Jot down some notes • Search the free "OpenStax" or "CK-12" textbooks for the topic and spend some time reading up about it. • Jot down some notes while reading • Do 5 practice problems (from Honors Chem Worksheets, the internet, textbook, etc)	

Topic Lecture Note Titles, Questions, and Score

*Use binder paper to show your work for **ALL** math problems!*

N3 – Significant Figures _____ / 4

1. Using the rules of significant figures, calculate the following:
   $6.167 + 70 =$
   A) 76
   B) 80
   C) 76.167
   D) 77

2. The number 14.809 rounded to three significant figures is
   A) 15.0
   B) 14.9
   C) 14.81
   D) 14.8

3. How many significant figures are there in the result of the calculation?
   $(4.321/2.8) \times (6.9234 \times 10^5)$
   A) 1
   B) 2
   C) 3
   D) 4

4. The result of the calculation has how many significant figures?
   $(0.4333\ J/g\ °C)\ (33.12°C - 31.12°C)(412.1\ g)$
   A) 1
   B) 2
   C) 3
   D) 4

N5 – Atomic Numbers and Isotopes _____ / 4

5. How many electrons are present in a fluorine, F, atom?
   A) 9
   B) 10
   C) 11
   D) 18

6. 54 p^+, 54 e^-, and 78 n^0 is
   A) $^{132}_{54}Xe$
   B) $^{132}_{55}Cs$
   C) $^{78}_{54}Xe$
   D) $^{54}_{78}Pt$

7. How many protons, electrons, and neutrons, does $^{27}Al^{3+}$ have?
   A) 13, 13, 14
   B) 13, 10, 14
   C) 13, 13, 27
   D) 13, 10, 27

8. An element's most stable ion forms an ionic compound with chlorine having the formula XCl_2. If the ion of X has a mass of 89 and 36 electrons, what is the identity of X, and how many neutrons does it have?
   A) Kr, 53 neutrons
   B) Kr, 55 neutrons
   C) Se, 55 neutrons
   D) Sr, 51 neutrons

N10 - Introduction to Electrons, N12 - Writing e- Configs, N13 - Configs of Ions & Noble Gas Configs _____ / 4

9. State the maximum number of electrons allowed in each.
   a. 4th principal energy level _____
   b. any *d* sublevel _____
   c. a 2*p* orbital _____

10. The configuration for sulfur is
    A) $1s^2 2s^2 2p^6 3s^2 3p^2$
    B) $1s^2 2s^2 2p^6 3s^2 3p^4$
    C) $1s^2 2s^2 2p^6 3s^5$
    D) $1s^2 2s^2 2p^6 3s^2 3p^5$

11. Draw the orbital diagram for the ground state of oxygen.

    ____ ____ ____ ____ ____
    1s 2s 2p

12. The electron configuration of Cr^{3+} is
    A) $[Ar]4s^2 3d^1$
    B) $[Ar]4s^1 3d^2$
    C) $[Ar]3d^3$
    D) $[Ar]4s^2 3d^4$

N15 - Periodic Trends _____ / 4

13. Which of the following exhibits the correct orders for both atomic radius and ionization energy, respectively? (smallest to largest)
    A) S, O, F, and F, O, S
    B) F, S, O, and O, S, F
    C) S, F, O, and S, F, O
    D) F, O, S, and S, O, F

14. Which is **false**?
    A) Elements in the same column have similar reactivities since their valence e-'s tend to be located in the same types of orbitals.
    B) Isoelectronic ions must have the same electron configuration.
    C) Atomic radius increases going across a period from left to right because the number of e-'s increases, so they are located further from the nucleus.
    D) It takes more energy to remove an electron from Li than from Cs because the valence e-'s in Li are located closer to the nucleus.

15. Order the following ions from **smallest to largest atomic size**.

    As^{3-}, Se^{2-}, Sr^{2+}, Rb^+, Br^-
    A) $As^{3-} < Se^{2-} < Br^- < Rb^+ < Sr^{2+}$
    B) $Sr^{2+} < Rb^+ < As^{3-} < Se^{2-} < Br^-$
    C) $As^{3-} < Se^{2-} < Br^- < Sr^{2+} < Rb^+$
    D) $Sr^{2+} < Rb^+ < Br^- < Se^{2-} < As^{3-}$

16. Which is true?
    A) The Kr 1*s* orbital is smaller than the He 1*s* orbital because Kr's *p* and *d* orbitals crowd the *s* orbitals.
    B) The Kr 1*s* orbital is larger than the He 1*s* orbital because Kr has more e-'s.
    C) The Kr 1*s* orbital is smaller than the He 1*s* orbital because Kr's nuclear charge draws the electrons closer.
    D) The Kr 1*s* orbital and He 1*s* orbital are the same size because both *s* orbitals can only have two electrons.

N16 - Bonding and Naming, N17 - Writing Neutral Compounds _____ / 4

17. The correct formula for ammonium sulfate
    A) NH_4SO_3
    B) NH_4SO_4
    C) $(NH_4)_2SO_3$
    D) $(NH_4)_2SO_4$

18. The correct name for FeO is
    A) iron oxide
    B) iron(II) oxide
    C) iron(I) oxide
    D) iron monoxide

19. Give the formula for mercury(II) sulfide.

20. The correct name for P_2O_5 is
    A) phosphorus(II) oxide
    B) phosphorus(V) oxide
    C) diphosphorus oxide
    D) diphosphorus pentoxide

N18 - Lewis Structures, N19 – VSEPR _____ / 4

21. Which of the following has a double bond?
    A) H_2O
    B) C_2H_2
    C) C_2H_4
    D) CN^-

22. Draw the Lewis Structure for NH_4^+

23. CBr_2H_2 BH_3 $XeCl_4$ SF_4
    Which has a see-saw shape?
    A) CBr_2H_2
    B) BH_3
    C) $XeCl_4$
    D) SF_4

24. CBr_2H_2 BH_3 $XeCl_4$ SF_4
    Which has bond angles of 109.5˚
    A) CBr_2H_2
    B) BH_3
    C) $XeCl_4$
    D) SF_4

N20 – Polarity, N21 – IMFs _____ / 4

25. How many are nonpolar?
    CO NH_3 CO_2 CH_4 H_2
    A) 1
    B) 2
    C) 3
    D) 4

26. Order from weakest to strongest .
    A) dipole-dipole, London Dispersion, ionic, and hydrogen-bonding
    B) London Dispersion, dipole-dipole, hydrogen-bonding, ionic
    C) hydrogen-bonding, dipole-dipole, London Dispersion, and ionic
    D) dipole-dipole, ionic, London Dispersion, and hydrogen-bonding

27. Which of the following substances would you expect to have the lowest boiling point?
    A) diamond
    B) methane, CH_4
    C) sodium nitrate, $NaNO_3$
    D) glycerine, $C_3H_5(OH)_3$

28. Which would you expect to have the highest boiling point?
    A) F_2
    B) Cl_2
    C) Br_2
    D) I_2

N22 - Balancing Equations, N23 - Types of Reactions _____ / 4

29. All of the following are clues that a chemical rxn has taken place **except**
    A) A color change occurs.
    B) A solid forms.
    C) The reactant is smaller.
    D) Bubbles form.

30. Balance what is the number in front of the substance in bold type?
    $Pb(NO_3)_2 + K_2CO_3 \rightarrow PbCO_3 + \mathbf{KNO_3}$
    A) 5
    B) 4
    C) 3
    D) 2

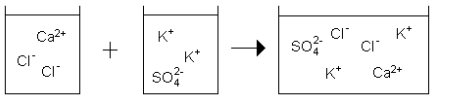
31. Balance. Determine the sum of the coefficients.
    $FeO(s) + O_2(g) \rightarrow Fe_2O_3(s)$
    A) 3
    B) 4
    C) 6
    D) 7

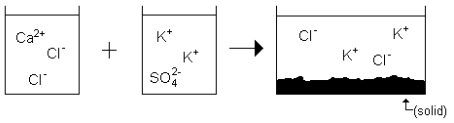
32. Sodium metal reacts with water to produce aqueous sodium hydroxide and hydrogen gas. Write the balanced equation for this reaction.

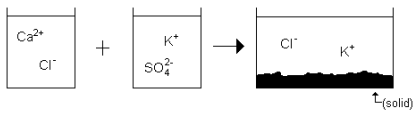
N24 - Predicting Products (and net ionic) _____ / 4

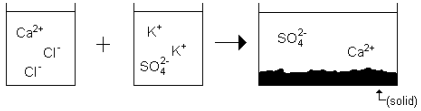
33. Write the balanced molecular equation for the reaction between aqueous solutions of lithium phosphate and sodium hydroxide.

34. Which drawing **best** represents the mixing of aqueous calcium chloride with aqueous potassium sulfate when they are mixed in stoichiometric amounts (neither reactant is limiting)?

A) 

B) 

C) 

D) 

35. Predict the products and balance the equation
$KI + Cl_2 \rightarrow$

36. Write the molecular equation, the complete ionic equation, and the net ionic equation for the following reaction: Aqueous solutions of copper(II) nitrate and sodium hydroxide are mixed to form solid copper(II) hydroxide and aqueous sodium nitrate.

N25 - Molar Mass and Molar Conversions, N26 - Mole Ratio and Stoichiometry _____ / 4

37. Which represents the greatest number of atoms?
A) 50.0 g Al
B) 50.0 g Cu
C) 50.0 g Zn
D) 50.0 g Fe

38. The number of grams in 1.15 mol of sodium carbonate is
A) 92.2 g
B) 0.0109 g
C) 95. g
D) 122. g

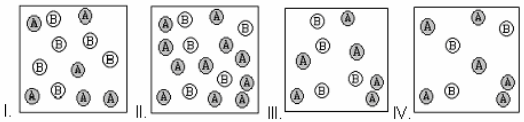
39. $Cu(s) + 2AgNO_3(aq) \rightarrow 2Ag(s) + Cu(NO_3)_2(aq)$
what number of grams of silver can be produced from the reaction of 33.9 g of copper?
A) 115 g Ag
B) 57.6 g Ag
C) 28.8 g Ag
D) 39.9 g Ag

40. If 22.5 g of CO_2 is produced in the reaction of C_2H_2 with O_2 to form CO_2 and H_2O, how many grams of H_2O are produced?
A) 9.21 g
B) 4.61 g
C) 18.4 g
D) 3.07 g

N27 - Limiting Reagent Stoichiometry _____ / 4

41. $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$
What number of moles of H_2 will be produced when 4.0 mol Na is added to 1.4 mol H_2O?
A) 0.7 mol
B) 2.8 mol
C) 2.0 mol
D) 1.4 mol

42. $2A + B \rightarrow C$. In which case is B the limiting reactant?



A) I C) III
B) II D) IV

43. Which of the following mixtures would produce the **greatest** amount of product, assuming all went to completion
$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
A) 3 moles of N_2 and 3 moles of H_2
B) 1 mole of N_2 and 6 moles of H_2
C) 5 moles of N_2 and 3 moles of H_2
D) All would produce the same amount of product.

44. A 2.00 g sample of NH_3 reacts with 4.00 g of O_2
$4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$
If O_2 is the limiting reactant how much excess reactant remains after the rxn is done?
A) 0.30 g
B) 0.70 g
C) 0.55 g
D) 0.43 g

N31 - Basic Gas Laws, N32 - Ideal Gas Law, N33 - Dalton's Law of Partial Pressures _____ / 4

45. Consider a gas at 1.00 atm in a 5.00-L container at 20.°C. What pressure does the gas exert when transferred to a volume of 2.30 L at 43°C?
A) 4.67 atm
B) 2.02 atm
C) 0.371 atm
D) 2.34 atm

46. Determine the pressure exerted by 2.05 mol of gas in a 2.92-L container at 32°C.
A) 1.84 atm
B) 51.3 atm
C) 17.6 atm
D) 5.38 atm

47. The valve between a 5-L tank containing a gas at 9 atm and a 10-L tank containing a gas at 6 atm is opened. Calculate the final pressure in the tanks.
A) 3 atm
B) 4 atm
C) 7 atm
D) 15 atm

48. Which of the following is *not* a postulate of the kinetic molecular theory?
A) Gas particles have most of their mass concentrated in the nucleus of the atom.
B) The moving particles undergo perfectly elastic collisions with the walls of the container.
C) The forces of attraction and repulsion between the particles are insignificant.
D) The average kinetic energy of the particles is directly proportional to the absolute temperature.

N34 - Gas Stoichiometry _____ / 4

49. $C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(g)$
What volume of oxygen gas at STP is needed to react with 3.94 mol of C_2H_4? (Ignore signficant figures for this problem.)
A) 11.8 L
B) 29.4 L
C) 265 L
D) 88.3 L

50. It is found that 250. mL of a gas at STP has a mass of 1.36 g. What is the molar mass?
A) 122 g/mol
B) 5.44 g/mol
C) 11.2 g/mol
D) 22.4 g/mol

51. You place 15.0 g of nitrogen gas and 15.0 g of hydrogen gas in a container fitted with a massless, frictionless piston. If the original volume of the container is 10.3 L, what is the volume after the reaction has run to completion? Assume constant temperature.
$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
A) 11.90 L
B) 1.38 L
C) 6.41 L
D) 8.92 L

52. $2H_2O_2(aq) \rightarrow 2H_2O(l) + O_2(g)$
Suppose 143.0 g of hydrogen peroxide decomposes and all of the oxygen gas is collected in a balloon at 1.00 atm and 25°C. Determine the volume of the balloon.
A) 4.31 L
B) 102.8 L
C) 51.4 L
D) 8.62 L

N35 - Specific Heat, N36 – Calorimetry _____ / 4

53. A 5.10-g sample of iron is heated from 36.0°C to 75.0°C. The amount of energy required is 89.51 J. The specific heat capacity of this sample of iron is
A) 1.78×10^4 J/g °C
B) 2.22 J/g °C
C) 0.234 J/g °C
D) 0.450 J/g °C

54. Assume that 248.3 J of heat is added to 5.00 g of water originally at 23.0°C. What would be the final temperature of the water? (Specific heat capacity of water = 4.184 J/g°C.)
A) 11.9 °C
B) 49.9 °C
C) 62.9 °C
D) 34.9 °C

55. A 56.3-g sample of aluminum at 95.0°C is dropped into 35.0 g of water at 40.0°C. What is the final temperature of the mixture? (specific heat capacity of aluminum = 0.89 J/g°C; specific heat capacity of water = 4.184 J/g°C)
A) 54°C
B) –5.6°C
C) 110°C
D) 23°C

56. Two metals of equal mass with different heat capacities are subjected to the same amount of heat. Which undergoes the smallest change in temperature?
A) The metal with the higher heat capacity.
B) The metal with the lower heat capacity.
C) Both undergo the same change in temperature.
D) You need to know the initial temperatures of the metals.

N37 - Heating and Cooling Curves _____ / 4

57. As water freezes the energy in the reaction is
A) released
B) Absorbed
C) neither
D) does not change

58. During boiling which statements is true?
A) The speed of the molecules is decreasing
B) The speed of the molecules is increasing
C) The distance between the molecules is decreasing
D) The distance between the molecules is increasing

59. How much energy is absorbed when 18g ice at 0°C is heated to 75°C?
A) 11655 J
B) 46328 J
C) 9778 J
D) 6012 J

60. What is the energy involved when converting 10 grams of steam at 120 C into ice at -20 C?
A) 2618 J
B) -2618 J
C) 30912 J
D) -30912 J

N38 - Energy of Reactions _____ / 4

61. C_2H_5OH (l) + $3O_2$ (g) → $2CO_2$ (g) + $3H_2O$ (l)
$\Delta H = -1.37 \times 10^3$ kJ
When a 15.5-g sample of ethyl alcohol (molar mass = 46.1 g/mol) is burned, how much energy is released??
A) 3.36×10^{-1} kJ
B) 4.61×10^{-1} kJ
C) 4.61×10^2 kJ
D) 2.12×10^4 kJ

62. Breaking a bond is always _____, and making a bond is always _____.
A) Endo, Exo
B) Endo, Endo
C) Exo, Endo
D) Exo, Exo

63. Using the data below, what is $\Delta H°$ for the reaction: A + 2D → 2E
Rxn 1 A + 2B → 2C $\Delta H° = 5$ kJ
Rxn 2 D + C → E + B $\Delta H° = 8$ kJ
A) 13 kJ
B) -11 kJ
C) -3 kJ
D) 21 kJ

64. What is the $\Delta H°_{rxn}$ for
$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
$\Delta H°_{formation}$ Values (kJ/mol)
CH_4 = -74.80 O_2 = 0
CO_2 = -393.50 H_2O = -285.83
A) -604.53
B) 604.53
C) -890.36
D) 890.36

N39 - Solutions Concepts, N40 - Solutions Calculations _____ / 4

65. Determine the concentration of a solution made by dissolving 22.5 g of sodium chloride in 750.0 mL of solution.
A) 0.289 *M*
B) 30.0 *M*
C) 0.385 *M*
D) 0.513 *M*

66. One mole of each of the following compounds is added to water in separate flasks to make 1.0 L of solution. Which solution has the largest **total** ion concentration?
A) calcium carbonate
B) potassium phosphate
C) aluminum hydroxide
D) silver chloride

67. What mass of solute is contained in 417 mL of a 0.157 *M* magnesium fluoride solution?
A) 4.08 g
B) 65 g
C) 9.8 g
D) 1.05 g

68. What volume of 17.8 *M* H_2SO_4 is required to prepare 12.0 L of 0.156 *M* sulfuric acid? (Ignore significant figures for this problem.)
A) 231 mL
B) 2.78 L
C) 114 mL
D) 105 mL

N41 - Kinetics, Rate Expressions, Average Rates _____ / 4

69. $2H_2 + O_2 \rightarrow 2H_2O$
What is the ratio of the initial rate of appearance of water to the initial rate of disappearance of oxygen?
A) 1 : 1
B) 2 : 1
C) 1 : 2
D) 2 : 2

70. $4NH_3 + 7O_2 \rightarrow 4NO_2 + 6H_2O$
At a certain instant the initial rate of disappearance of oxygen gas is X. What is the value of the appearance of water at the same instant?
A) 1.2 X
B) 1.1 X
C) 0.86 X
D) 0.58 X

71. $2O_3(g) \rightarrow 3O_2(g)$
The average rate of disappearance of ozone is 7.73×10^{-3} atm over an interval of time. What is the rate of appearance of O_2 during this interval?
A) 1.16×10^{-2} atm/s
B) 7.73×10^{-3}atm/s
C) 5.15×10^{-3}atm/s
D) 2.31×10^{-2}atm/s

72. $B_3O_3^- + 5Br^- + 6H^+ \rightarrow 3Br_2 + 3H_2O$
At a particular instant in time, the value of $-\Delta[Br^-]/\Delta t$ is 3.5×10^{-3} mol/L s. What is the value of $\Delta[Br_2]/\Delta t$ in the same units?
A) 2.1×10^{-3}
B) 3.5×10^{-3}
C) 5.8×10^{-3}
D) 1.8×10^{-3}

N42 - Instantaneous Rates and Rate Laws _____ / 4

73. Which best describes the condition(s) needed for a successful formation for a product according to the collision model?
A) The collision must involve a sufficient amount of energy, provided from the motion of the particles, to overcome the activation energy.
B) The relative orientation of the particles has little or no effect on the formation of the product.
C) The relative orientation of the particles has an effect only if the kinetic energy of the particles is below some minimum value.
D) The energy of the incoming particles must be above a certain minimum value and the relative orientation of the particles must allow for formation of new bonds in the product.

74. Consider the following rate law: Rate = $k[A]^n[B]^m$
How are the exponents *n* and *m* determined?
A) By using the balanced chemical equation
B) By using the subscripts for the chemical formulas
C) By using the coefficients of the chemical formulas
D) By experiment

75. The following data were obtained for the reaction of NO with O_2. Concentrations are in molecules/cm^3 and rates are in molecules/$cm^3 \cdot s$.

$[NO]_o$	$[O_2]_o$	Initial Rate
1×10^{18}	1×10^{18}	2.0×10^{16}
2×10^{18}	1×10^{18}	8.0×10^{16}
3×10^{18}	1×10^{18}	18.0×10^{16}
1×10^{18}	2×10^{18}	4.0×10^{16}
1×10^{18}	3×10^{18}	6.0×10^{16}

What is the rate law?
A) Rate = $k[NO][O_2]$
B) Rate = $k[NO][O_2]^2$
C) Rate = $k[NO]^2[O_2]$
D) Rate = $k[NO]^2$

76. $2Fe(CN)_6^{3-} + 2I^- \rightarrow 2Fe(CN)_6^{4-} + I_2$

Run	$[Fe(CN)_6^{3-}]_0$	$[I^-]_0$	$[Fe(CN)_6^{4-}]_0$	$[I_2]_0$	Rate (M/s)
1	0.01	0.01	0.01	0.01	1×10^{-5}
2	0.01	0.02	0.01	0.01	2×10^{-5}
3	0.02	0.02	0.01	0.01	8×10^{-5}
4	0.02	0.02	0.02	0.01	8×10^{-5}
5	0.02	0.02	0.02	0.02	8×10^{-5}

What is the value of k?
A) $10^7\ M^{-5}\ s^{-1}$
B) $10^3\ M^{-3}\ s^{-1}$
C) $10\ M^{-2}\ s^{-1}$
D) $50\ M^{-2}\ s^{-1}$

N43 - Le Chatelier's Principle _____ / 4

77. Which of the following is true about chemical equilibrium?
   A) It is microscopically and macroscopically static.
   B) It is microscopically and macroscopically dynamic.
   C) It is microscopically static and macroscopically dynamic.
   D) It is microscopically dynamic and macroscopically static.

Use the following to answer Qs 78-80:
$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$

78. What would happen to the system if more $CaCO_3$ were added?
   A) More CaO would be produced.
   B) The $[CO_2(g)]$ would decrease.
   C) The amount of $CaCO_3$ would decrease.
   D) Nothing would change

79. What would happen to the system if the total pressure were increased by adding $CO_2(g)$?
   A) Nothing would happen.
   B) More $CO_2(g)$ would be produced.
   C) The amount of CaO would increase.
   D) The amount of $CaCO_3$ would increase.

80. What would happen to the system if the total pressure were increased by adding $Ar(g)$?
   A) Nothing would happen.
   B) More $CO_2(g)$ would be produced.
   C) The amount of CaO would increase.
   D) The amount of $CaCO_3$ would increase.

N44 - Equilibrium Constant and Quotient _____ / 4

81. For a particular system at a particular temperature there _____ equilibrium constant(s) and there _____ equilibrium position(s).
   A) are infinite; is one
   B) is one; are infinite
   C) is one; is one
   D) are infinite; are infinite

82. $A(g) + B(g) \rightleftharpoons C(g) + D(g)$. You have the gases A, B, C, and D at equilibrium. Upon adding gas A, the value of *K*:
   A) increases because by adding A, more products are made, increasing the product to reactant ratio.
   B) decreases because A is a reactant o the product to reactant ratio decreases.
   C) does not change because A does not figure into the product to reactant ratio.
   D) does not change as long as the temperature is constant.

83. $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
   At 2000°C, K = 0.01

   Predict the direction in which the system will move to reach equilibrium at 2000°C if 0.4 moles of N_2, 0.1 moles of O_2, and 0.08 moles of NO are placed in a 1.0-liter container.
   A) The system remains unchanged.
   B) The concentration of NO will decrease; the concentrations of N_2 and O_2 will increase.
   C) The concentration of NO will increase; the concentrations of N_2 and O_2 will decrease.
   D) The concentration of NO will decrease; the concentrations of N_2 and O_2 will remain unchanged.

84. $F_2(g) \rightleftharpoons 2F(g)$
   at a particular temperature, the concentrations at equilibrium are $[F_2] = 1.7 \times 10^{-2}$ mol/L and $[F] = 2.0 \times 10^{-4}$ mol/L. Calculate the value of the equilibrium constant from these data.
   A) 3.4×10^{-2}
   B) 1.8
   C) 4.2×10^{5}
   D) 2.4×10^{-6}

N45 - ICE Tables _____ / 4

85. Consider the reaction: $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$ at constant temperature. Initially a container is filled with pure $SO_3(g)$ at a pressure of 2 atm, after which equilibrium is reached. If *y* is the partial pressure of O_2 at equilibrium, the value of K_p is:
   A) $\dfrac{(2\text{-}2y)^2}{(y^2)(2y)}$
   B) $\dfrac{(2\text{-}y)^2}{(y^2)(y/2)}$
   C) $\dfrac{(2\text{-}y)^2}{(2y)^2(y)}$
   D) $\dfrac{(2\text{-}2y)^2}{(2y)^2(y)}$

86. $2N_2O(g) + N_2H_4(g) \rightleftharpoons 3N_2(g) + 2H_2O(g)$

   Initially there are 0.10 moles of N_2O and 0.25 moles of N_2H_4, in a 10.0-L container. If there are 0.064 moles of N_2O at equilibrium, how many moles of N_2 are present at equilibrium?
   A) 1.8×10^{-2}
   B) 3.6×10^{-2}
   C) 5.4×10^{-2}
   D) 1.1×10^{-1}

87. $2NOCl(g) \rightleftharpoons 2NO(g) + Cl_2(g)$
   $K = 1.6 \times 10^{-5}$. 1.00 mole of pure NOCl and 0.927 mole of pure Cl_2 are placed in a 1.00-L container. Calculate the equilibrium concentration of NO(g).
   A) 4.15×10^{-3} M
   B) 9.27×10^{-1} M
   C) 1.08 M
   D) 5.88×10^{-3} M

88. $H_2 + I_2 \rightleftharpoons 2HI$ $K = 40.8$ at a high temperature. If an equimolar mixture of reactants gives the concentration of the product to be 0.50 M at equilibrium, determine the initial concentration of hydrogen.
   A) 3.28×10^{-1} M
   B) 7.8×10^{-2} M
   C) 3.9×10^{-2} M
   D) 1.3×10^{1} M

N46 - Acids and Bases and pH Calculations _____ / 4

89. Calculate the $[OH^-]$ in a solution that has a pH of 3.65.
A) 4.5×10^{-11} *M*
B) 1.0×10^{-7} *M*
C) 2.2×10^{-4} *M*
D) 2.7×10^{-15} *M*

90. A solution has $[H^+] = 4.9 \times 10^{-3}$ *M*. The $[OH^-]$ in this solution is
A) 4.9×10^{11} *M*
B) 4.9×10^{-17} *M*
C) 2.0×10^{-12} *M*
D) 1.0×10^{-14} *M*

91. Calculate the $[H^+]$ in a 0.086 M solution of HCN, $K_a = 6.2 \times 10^{-10}$.
A) 1.0×10^{-7} M
B) 7.3×10^{-6} M
C) 5.3×10^{-11} M
D) 1.5×10^{-5} M

92. Which of the species below, when dissolved in H_2O, will not produce a basic solution?
A) SO_2
B) NH_3
C) BaO
D) $Ba(OH)_2$

N48 - Weak Acids and Bases _____ / 4

93. Identify the Bronsted acids and bases in the following equation (A = Bronsted acid, B = Bronsted base):

$HSO_3^- + CN^- \rightarrow HCN + SO_3^{2-}$

A)	B	A	B	A
B)	B	B	A	A
C)	A	B	A	B
D)	A	B	B	A

94. For weak acid, HX, $K_a = 1.0 \times 10^{-6}$. Calculate the pH of a 0.79 M solution of HX.
A) 0.10
B) 3.05
C) 6.10
D) 10.95

95. Saccharin is a monoprotic acid. If the pH of a 1.50×10^{-2} M solution of this acid is 5.53, what is the K_a of saccharin?
A) 2.0×10^{-4}
B) 1.5×10^{-2}
C) 5.8×10^{-10}
D) 2.9×10^{-6}

96. The pain killer morphine is a weak base when added to water. The reaction produces one mole of hydroxide ions for every one mole of morphine that dissolves. The K_b is 1.6×10^{-6}. What is the pH of a 3.56×10^{-3} M solution of morphine?
A) 4.12
B) 9.88
C) 5.76
D) 10.03

N49 - Salts _____ / 4

97. Which of the following correctly labels the salts?

HF	NH_3	HCN
$K_a = 3.5 \times 10^{-4}$	$K_b = 1.8 \times 10^{-5}$	$K_a = 4.9 \times 10^{-10}$

A) NaCN = acidic, NH_4F = basic, KCN = neutral
B) NaCN = acidic, NH_4F = neutral, KCN = basic
C) NaCN = basic, NH_4F = basic, KCN= neutral
D) NaCN = basic, NH_4F = acidic, KCN = basic

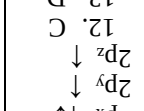
98. True or false: The species Cl^- is not a good base in aqueous solution.
A) True. This is because Cl^- is the conjugate base of a weak acid.
B) False. The species Cl^- is a good base in aqueous solution because it is the conjugate base of a strong acid.
C) True. This is because Cl^- is a good proton donor.
D) True. This is because water has a stronger attraction for protons than does Cl^-.

99. Determine the pH of 0.03 M solution of NaOCl
($K_{a\ HOCl} = 3.00 \times 10^{-8}$)
A) 4.00
B) 6.25
C) 10.0
D) 4.69

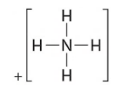
100. Calculate the pH of a 0.05 M solution NH_4Cl
$K_{b\ NH3} = 1.8 \times 10^{-5}$
A) 5.28
B) 8.72
C) 7.0
D) 3.44

ANSWER KEY

1. B
2. D
3. B
4. C
5. A
6. A
7. B
8. D
9.
a. 32
b. 10
c. 2
10. B

11.


12. C
13. D
14. C
15. D
16. C
17. D
18. B
19. H_gS
20. D

21. C
22.


23. D
24. A
25. C
26. B
27. B
28. D
29. C
30. D

31. D
32. $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$
33. $Li_3PO_4(aq) + 3NaOH(aq) \rightarrow Na_3PO_4(aq) + 3LiOH(aq)$
34. B
35. $2KI(aq) + Cl_2(g) \rightarrow 2KCl(aq) + I_2(s)$
36. $Cu(NO_3)_2(aq) + 2NaOH(aq) \rightarrow Cu(OH)_2(s) + 2NaNO_3(aq)$

$Cu^{2+}(aq) + 2NO_3^-(aq) + 2Na^+(aq) + 2OH^-(aq) \rightarrow$
$Cu(OH)_2(s) + 2Na^+(aq) + 2NO_3^-(aq)$

$Cu^{2+}(aq) + 2OH^-(aq) \rightarrow Cu(OH)_2(s)$

37. A
38. D
39. A
40. B

41. A
42. B
43. D
44. A
45. D
46. C
47. C
48. A
49. C
50. A

51. D
52. C
53. D
54. D
55. A
56. A
57. A
58. D
59. A
60. D

61. C
62. A
63. D
64. C
65. D
66. B
67. A
68. D
69. B
70. C

71. A
72. A
73. D
74. D
75. C
76. C
77. D
78. D
79. D
80. A

81. B
82. D
83. B
84. D
85. D
86. C
87. A
88. A
89. A
90. C

91. B
92. D
93. C
94. B
95. C
96. D
97. D
98. B
99. C
100. A