AP Chemistry
Hallsville High School

Summer Assignment
2019

AP Chemistry Summer Packet 2019

Welcome to AP Chemistry. The College Board describes this course as follows:

> AP Chemistry should meet the objectives of a good college general course. Students in such a course should attain a depth of understanding of fundamentals and a reasonable competence in dealing with chemical problems. The course should contribute to the development of the students' abilities to think clearly and to express their ideals, orally and in writing, with clarity and logic. The college course in general chemistry differs qualitatively from the usual first secondary school course in chemistry with respect to the kind of textbook used, the topics covered, the emphasis on chemical calculations and the mathematical formulation of principles, and the kind of laboratory work done by students. Quantitative differences appear in the number of topics treated, the time spent on the course by students, and the nature and the variety of experiments done in the laboratory. An AP Chemistry course must provide a laboratory experience equivalent to that of a typical college course.

Grading for the course will be as follows:
    70% Unit Tests
    30% Daily and Quizzes

In order to prepare for this course you will need to do the following:

1. Read the material thoroughly. If you have questions you may contact me by email over the summer (crigsby@hisd.com). I might not email you back immediately but I will email you.

2. Over the summer, you will use the internet, your Chemistry Journal, or any necessary resources to complete the summer assignment. The items in this assignment were covered in your Chemistry Class. The purpose of this packet is to review the material covered in your 1st year Chemistry Class.

You will have a quiz in class the first day of school over this material. Be sure you are prepared!

Please Note:
This assignment is a requirement and is NOT for extra credit!

1. **Work the problems on separate paper. Make sure the work is attached to the packet.**
2. **Memorize the polyatomic ions from 1st year Chemistry (make flashcards or use a phone app to help you)**
3. **Review naming compounds (make flashcards or use a phone app to help you)**
4. **Memorize the solubility rules from 1st year Chemistry**

NO LATE ASSIGNMENTS WILL BE ACCEPTED!!!

If this seems like too much work for the summer, please reconsider taking this course. Advanced Placement Chemistry is a college level course. You will need to be dedicated and work very hard if you are to be successful.

**Supplies needed for AP Chemistry:**

2 inch, 3 ring binder**

5 Dividers**

Highlighters**

Pencils**

Blue or black ink pens for Laboratory Notebook**

Laboratory Notebook (at least 100 pages, grid lined)**

- Upon completion of your test, your college may request to see your Laboratory Notebook. Your work must be neat, organized and professional. Here is the notebook I recommend and can be found on Amazon.com.
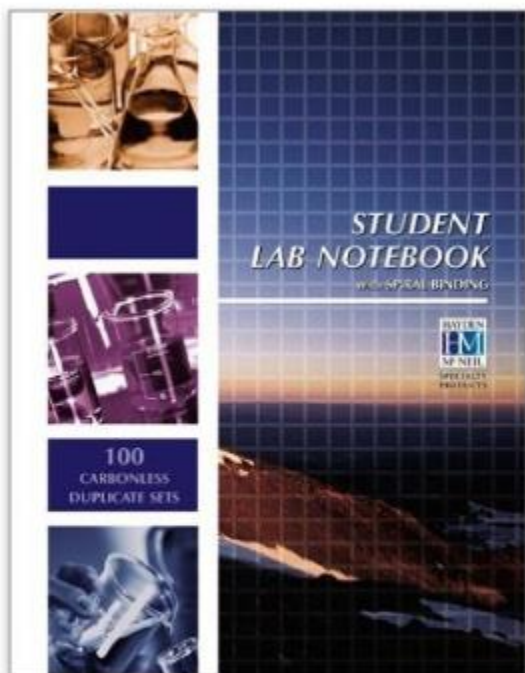
ISBN-13: 978-1930882744

ISBN-10: 1930882742

Goggles (optional)

- You may purchase your own goggles for lab, but only from me. The goggles have to meet certain safety requirements. Do not go and buy any this summer, I will have them for sale at the beginning of the school year.

TI-84 Plus Calculator (optional)

- You may use your own calculator for the AP Test

Internet Access (optional, but very beneficial)

Paper towels (optional, but appreciated)

Tissue (optional, but appreciated)

Hand Sanitizer (optional, but appreciated)

**If you have trouble getting any of the required supplies, please let me know.

Name: _____

AP Chemistry Summer Packet

<u>Name the following compounds:</u>

1. HCl

2. KCl

3. $FeCl_3$

4. HNO_3

5. NH_4OH

6. $Zn(NO_2)_2$

7. $CaBr_2$

8. Fe_2O_3

9. N_2O_5

10. H_2SO_3

11. $FeCO_3$

12. SO_3

<u>Write the chemical formula for the following compounds:</u>

13. manganese (II) oxide

14. acetic acid

15. hypochlorous acid

16. potassium permanganate

17. phosphorus trichloride

18. silver chloride

19. ammonium sulfide

20. iron (II) hydroxide

21. zinc hydroxide

22. hydriodic acid

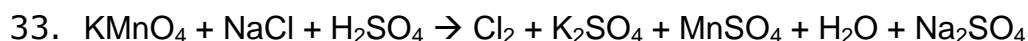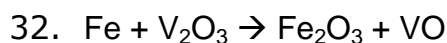23. dinitrogen pentoxide

24. aluminum oxide

<u>Write the balanced chemical equation to represent each of the following chemical reactions:</u>

25. zinc + copper (II) sulfate ➔ zinc sulfate + copper

26. silver nitrate + sodium bromide ➔ sodium nitrate + silver bromide

27. potassium chlorate (heated) ➜ potassium chloride + oxygen gas

28. water (electricity) ➜ hydrogen gas and oxygen gas

29. aluminum + oxygen gas ➜ aluminum oxide

30. iron (III) chloride + ammonium hydroxide ➜ iron (III) hydroxide + ammonium chloride

31. iron (III) chloride + potassium hydroxide ➜ potassium chloride + iron (III) hydroxide

For each reaction below, identify the atom oxidized, the atom reduced, the oxidizing agent, the reducing agent, the oxidation half reaction, and the reduction half reaction:

32. $Fe + V_2O_3 \rightarrow Fe_2O_3 + VO$

33. $KMnO_4 + NaCl + H_2SO_4 \rightarrow Cl_2 + K_2SO_4 + MnSO_4 + H_2O + Na_2SO_4$

Write the electron configuration for the following atoms:

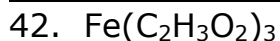|	
34. oxygen	38. calcium
35. aluminum	39. bromine
36. chlorine	40. strontium
37. titanium	41. nickel

Show all work for the following on <u>attached sheets of paper</u>.
Record your answers below.
Include all 5 Steps to solve a problem when needed.

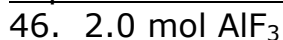Find the molar mass for each of the following compounds:
42. $Fe(C_2H_3O_2)_3$ 44.   nitric acid

43. $CuSO_4 \cdot 5H_2O$ 45. aluminum sulfate

Express each of the following in grams:
46. 2.0 mol AlF_3 48. 0.1 mol iron (III) carbonate

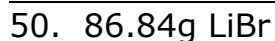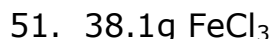47. 0.5 mol KNO_3 49. 0.2 mol sodium sulfate decahydrate

Convert each of the following to its equivalent in moles:
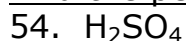50. 86.84g LiBr   52. 5.0g ammonium sulfate

51. 38.1g $FeCl_3$ 53. 0.257g sulfur pentachloride

Find the percent composition of each element in the following compounds:
54. H_2SO_4 56. ammonium chloride

55. $Ca(OH)_2$ 57. phosphoric acid

Find the empirical formula for each of the following substances. The percent composition is given:
58. 40% carbon; 6.7% hydrogen; 53.3% oxygen

59. 56.4% potassium; 8.7% carbon; 34.9% oxygen

Gas Laws
60. A 1.0L rubber bladder is filled with carbon dioxide gas in a warm (25°C) room (pressure is 745 torr). What volume will the gas occupy when it is taken into the open air where the temperature is -12°C and the pressure is 742 torr?

61. A rubber balloon containing 1.0L of gas is carried from the top of a mountain to the bottom of the mountain, where its volume is measured as 0.85L at standard pressure. Assuming that there was no temperature change during the trip, what was the pressure at the top of the mountain?

62. 500mL of air are trapped in a tube over mercury at 25°C. It is found that, after six days, the air has expanded so that 32mL have escaped the tube. What total temperature change occurred over this period if the pressure remained constant?

Solve the following problems using the Ideal Gas Law equation:
63. What pressure is exerted by 1.0 mol of an ideal gas contained in a 1.0L vessel at 0°C?

64. What volume will 5.0 mol of an ideal gas occupy at 25°C and 1.5 atm of pressure?

65. Calculate the molecular mass of a gas if 4.5L of the as at 785 torr and 23.5°C has a mass of 13.5g.

Stoichiometry
66. Zinc metal will react with hydrochloric acid to produce hydrogen gas and zinc chloride. If 50.0g of zinc are to be used in the reaction, how much acid would be needed to completely react with all of the zinc? How much hydrogen gas (in grams) would be produced?

67. Phosphoric acid is produced in the reaction between calcium phosphate and sulfuric acid. How much of the phosphoric acid would be produced from 55g of calcium phosphate? What other product is formed and in what quantity?

68. Calcium oxide can be prepared by heating calcium in oxygen gas. How much calcium would be needed to make 15.0g of calcium oxide in this way?

Find the pH of the following strong acids and bases:
69. $[H^+]$ = 3.6 x 10^{-9} M   71. $[OH^-]$ = 6.5 x 10^{-4} M

70. 0.25M HCl   72. 0.1M NaOH

73. A student adds 4.5g of sodium chloride to 100mL of water. Calculate the molarity of the solution made.

74. In a lab, you stir 25g of $MgCl_2$ into 550mL of water. What is the molarity of the solution made?

75. How many grams of NaOH is needed to make 500mL of a 0.1M solution to be used in the lab?

Calculate the Enthalpy using the bond energies given:

Relevant Bond Energies (kJ/mol)	
C-H	414
O=O	502
C=O	730
O-H	464

76. $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(g)}$
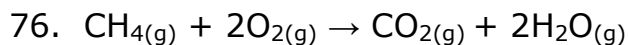
77. Now tell me why you decided to take AP Chemistry.

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