

HONORS CHEMISTRY
1ST SEMESTER EXAM REVIEW
DECEMBER 2014

The following is a list of objectives that you should have accomplished this semester in Honors Chemistry. You should be able to answer each one before you take your exam.

BONUS: YOU MAY RECEIVE 1/4 POINT BONUS ON YOUR EXAM FOR EACH OBJECTIVE THAT IS ANSWERED COMPLETELY AND CORRECTLY AND TURNED IN BY THE DAY OF YOUR EXAM. You are encouraged to answer all of the objectives to adequately study for the exam; however, a maximum of 40 OBJECTIVES will count for extra credit.

USE AT LEAST 1/2 OF A PAGE TO ANSWER EACH OBJECTIVE (leave that much space, even if it does not need that much room). Begin the next question either half way down the page or at the beginning of the next page. DO NOT ANSWER MORE THAN TWO OBJECTIVES PER PAGE. Write on the FRONT AND BACK of the page. Also, put your name and class period on the top right corner of each page.

YOU CANNOT COPY ANYONE ELSE'S ANSWERS (**NO ONE'S - NOT EVEN YOUR LAB PARTNER'S**), WRITTEN OR ORAL, FOR ANY OBJECTIVE. If you have done so, or if you know of anyone who has done so, you are obligated to tell me immediately. Your honor is worth more than ten points extra credit!

1. Describe at least 10 lab safety rules.
2. Describe the use of at least 10 pieces of laboratory equipment.
3. Draw and label a diagram showing the proper method of (A) boiling a liquid (B) filtering a liquid (C) heating a substance intensely.
4. Distinguish between qualitative and quantitative observations, and intensive and extensive observations and give two examples of each. (eight examples in all)
5. Distinguish between a quantity, a unit, and a measurement standard.
6. Name SI units for length, mass, time, temperature, energy, volume, and density.
7. Perform unit conversions using the factor-label method (the Q formula). (Give four examples.)
8. Explain the difference between mass and weight.
9. Solve volume and density problems (give one example of each).
10. Explain the difference between accuracy and precision.
11. Determine the number of significant figures in measurements. (Give four examples.)
12. Use scientific notation to write numbers and make calculations. (Give four examples.)
13. Define, give the equation, and plot a graph of a direct proportionality.
14. Define, give the equation, and plot a graph of an inverse proportionality.
15. Define chemistry and identify some (3) applications of chemistry in everyday life.
16. Define the branches of chemistry.
17. Compare and contrast basic research, applied research, and technological development.
18. Distinguish between the types of physical and chemical properties of matter and give examples of each.

19. Classify changes in matter as physical or chemical and give reasons for your choice.
20. Distinguish between exothermic and endothermic reactions.
21. Explain the gaseous, liquid, and solid states of matter in terms of particles using a drawing of each.
22. Distinguish between homogeneous and heterogeneous matter, mixtures and pure substances and give example of each.
23. Describe in detail how you could use your knowledge of physical properties to separate a mixture that contained at least four different substances.
24. Know the names, symbols, and oxidation numbers of the common elements. *(You must know this information for the exam; however, this would be a ton of information to include in your extra credit. Therefore, make sure you know this, but you may leave it out of the extra credit.)*
25. Discuss three differences in properties between metals, nonmetals and metalloids, and give examples of their uses.
26. Memorize the metalloids use the periodic table to determine if other elements are metals or metalloids. (Give four examples of each.)
27. Use the steps of the scientific method to solve a "problem" and define each step.
28. Determine the formula and name of an ionic compound between any two elements or ions. (4 examples of each)
29. Determine the formula and name of an ionic compound between two given elements or ions when the first element can have more than one oxidation number. (4 examples of each)
30. Using prefixes name a binary molecular compound from its formula and write the formula of a binary molecular compound given its name. (4 examples)
31. Memorize the names and symbols of common polyatomic ions. (List all)
32. Memorize the chemical names and formulas of common substances. (List all)
33. Memorize the names and formulas of the common laboratory acids. (List all)
34. Give the oxidation number for each element in the formula of a chemical compound. (4 examples)
35. Give the oxidation number for each element in the formula of a polyatomic ion. (4 examples)
36. Calculate the formula mass or molar mass of any given compound and use molar mass to convert from mass in grams of a compound to moles of that compound. (2 examples)
37. Define mole in terms of Avogadro's number, and define molar mass.
38. Solve problems involving mass in grams from moles, amount of atoms from moles, and amount of atoms from mass. Give one example of each.
39. Determine the number of molecules in a certain number of moles or given mass of a compound. Give one example of each
40. Calculate the percent composition of a given chemical compound.
41. Find the simplest formula of a compound from either percent or mass composition use it to find the molecular formula.
42. List four natural polymers and four synthetic polymers
43. Describe the differences in the structures of linear, branched, and cross-linked polymers and how these differences contribute to their properties and their uses.

44. State the laws of conservation of mass, the law of definite composition, the law of multiple proportions and explain their meanings with an example of each law.
45. Summarize the five essential points of Dalton's atomic theory.
46. Describe the properties of protons, neutrons, and electrons.
47. Explain the contribution(s) each of the following made to chemistry: Antoine Lavoisier, Joseph Proust, John Dalton, J. J. Thomson, Robert Millikan, Ernest Rutherford, James Chadwick, and Lise Meitner.
48. Define atomic number and mass number, and describe how they apply to isotopes.
49. Describe the three isotopes of hydrogen: name, symbol, atomic number, mass number, number of protons, neutrons, and electrons.
50. Given hyphen notation, determine the number of protons, neutrons, and electrons in an isotope (give 3 examples).
51. Given a nuclear symbol, determine the number of protons, neutrons, and electrons in an isotope (give 3 examples).
52. Calculate the average atomic mass of an element given the relative abundances of each isotope of the element. Give one example.
53. Describe the roles of the Becquerel, Curies, the Joliot-Curies, Leo Szilard, and Enrico Fermi in nuclear chemistry.
54. Define and describe the factors that influence nuclear stability.
55. Describe 5 properties of radioactive nuclides.
56. Identify five types of nuclear decay and give an example of each in a nuclear equation.
57. Define half-life and use it in a problem to find time passed and amount remaining (include 2 separate problems).
58. Describe four uses of radioactive isotopes.
59. Define nuclear fission, chain reaction, and nuclear fusion and distinguish between them.
60. Describe the function of control rods, nuclear fuel, moderators, and coolants in nuclear reactors.