HONORS CHEMISTRY
2ND SEMESTER EXAM REVIEW

THE FOLLOWING IS A LIST OF OBJECTIVES THAT YOU SHOULD HAVE ACCOMPLISHED THIS SEMESTER IN CHEMISTRY. YOU SHOULD ANSWER EACH ONE BEFORE YOU TAKE YOUR EXAM.

BONUS: YOU MAY RECEIVE A 0.2 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 50 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.

DO NOT COPY ANYONE ELSE'S WORK **(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. 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.)*
2. Determine the formula and name of ionic compounds – three binary compounds and three with polyatomic ions. (3 examples of each)
3. Determine the formula and name of an ionic compound between two given elements or ions when the when the first element can have more than one oxidation number. (4 examples)
4. Using prefixes name a binary molecular compound from its formula and write the formula of a binary molecular compound given its name. (3 examples with nonmetal and nonmetal, and 3 examples with metalloid and nonmetal)
5. Memorize the names and symbols of common polyatomic ions. (List all)
6. Memorize the names and formulas of the common laboratory acids and the chemical names and formulas of common substances. (List all)
7. Describe five symbols that are used in chemical equations and use them in a balanced equation (they may be in the same or different equations).
8. Define diatomic molecules and list the formulas for the diatomic molecules.
9. Give four examples of evidence of a chemical change.
10. Define and give three examples for synthesis reactions.
11. Define and give three examples for decomposition reactions.
12. Define and give three examples for single replacement reactions.
13. Define and give three examples for double replacement reactions.
14. Define and give three examples for combustion reaction.
15. Use the activity series to predict whether or not single replacement reaction will occur. Write two (2) examples of reactions that will not occur – one with metals and one with nonmetals.
16. Use the activity series to predict whether or not the synthesis of oxides (burning in air) reactions will occur and what the product will be. Write one (1) balanced equation for a reaction that will occur and one (1) example of a reaction that will not occur.

17. Use the activity series to predict whether or not the decomposition of oxides reactions will occur and what the product will be. Write one (1) balanced equation for a reaction that will occur and one (1) example of a reaction that will not occur.

18. Given a chemical reaction, work mole-mole stoichiometry problems *(work two examples – make up your own equation or use one from the book).*

19. Given a chemical reaction, work mole-mass and mass mole stoichiometry problems (one example of each - *make up your own equation or use one from the book*).

20. Given a chemical reaction, work mass-mass stoichiometry problems (two examples - *make up your own equation or use one from the book*).

21. Given the amounts of two reactants in a chemical reaction, determine which of the reactants is the limiting reactant and calculate the mass of a product (one example - *make up your own equation or use one from the book*).

22. Define theoretical yield, actual yield, and percent yield and explain how to calculate percent yield.

23. Given the mass of a reactant in a chemical reaction and the mass of a product produced in the experiment, calculate the percent yield of the reaction (one example - *make up your own equation or use one from the book*).

24. 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.

25. Summarize the five essential points of the modern atomic theory and describe how it has changed from Dalton's atomic theory.

26. Describe the properties of protons, neutrons, and electrons.

27. 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, Lise Meitner, and Mendeleev.

28. Define atomic number and mass number, and describe how they apply to isotopes.

29. Describe the three isotopes of hydrogen: name, symbol, atomic number, mass number, number of protons, neutrons, and electrons.

30. Given hyphen notation, find the number of protons, neutrons, and electrons in an isotope (give 3 examples).

31. Given a nuclear symbol, determine the number of protons, neutrons, and electrons in an isotope (give 3 examples).

32. Calculate the average atomic mass of an element given the relative abundances of each isotope of the element. Give one example.

33. Describe the roles of the Becquerel, Curies, the Joliot-Curies, and Enrico Fermi in nuclear chemistry.

34. Define and describe the factors that influence nuclear stability.

35. Describe 5 properties of radioactive nuclides.

36. Identify five types of nuclear decay and give an example of each in a nuclear equation.

37. Use half-life to find the total time passed given the initial and final masses of an isotope, AND to find the amount of an isotope remaining given the time that has passed. (two problems total)

38. Describe four uses of radioactive isotopes.

39. Use a diagram and at least two sentences to explain how/why isotopes are used in smoke detectors.

40. Define nuclear fission, chain reaction, and nuclear fusion and distinguish between them.

41. Describe the function of control rods, nuclear fuel, moderators, and coolants in nuclear reactors.

42. Give examples of the uses (2) of each of the types of electromagnetic radiation, and be able to list the spectrum in order by frequency, wavelength, or energy the electromagnetic spectrum and the visible spectrum. Know the wavelength range of the visible spectrum.

43. Work problems with frequency, wavelength and speed of electromagnetic radiation. Give one example.

44. Be able to illustrate, describe, and give examples of the photoelectric effect.

45. Be able to illustrate and describe spectroscopy and the role it plays in identifying elements.

46. Work problems with the frequency and energy of electromagnetic radiation using Planck's constant. Give one example.

47. Describe the modern periodic table, including groups, periods, types of elements, and blocks. *(Make a rough sketch with labels.)*

48. Describe the relationship between electrons in sub-levels and the length of each period of the periodic table.

49. Compare and the contrast general properties of the alkali metals, the alkaline earth metals, and the transition metals, and describe their location in the Periodic Table. Give two examples of each type of element.

50. Compare and the contrast general properties of the halogens and the noble gases and describe their location in the Periodic Table. Give two examples of each type of element.

51. Write orbital notation. Give four examples, one from each block.

52. Write electron configuration notation. Give four examples, one from each block.

53. Use electron configuration to determine the block, group, period and type of an element. Give one example from each block.

54. State the octet rule and use it to describe ionic and covalent bonding.

55. Classify bonds according to electronegativity differences. (4 examples)

56. Write the Lewis structure for molecules and polyatomic ions containing both single and multiple bonds and use the VSEPR theory to name the shape of each. (2 examples of molecules and 2 examples of polyatomic ions)

57. Draw ionic bonding and write the formula unit for the compound formed (3 examples).

58. List and compare the distinctive properties of ionic and molecular compounds. Use bond energy and lattice energy to explain the differences

59. Describe the electron-sea model of metallic bonding and explain why metals are malleable and ductile, but ionic compounds are not.

60. Describe dipole-dipole forces, hydrogen bonding, an induced dipole and London dispersion forces.

61. Use van der Waals forces to explain why molecules exist either as solids, liquids or gases at room temperature.

62. Use bond type to describe solubility – why some substances are soluble and some substances are not.