Chemistry Semester 1 Review (Chapters 1 – 6)

Chapter 1 –
1. Distinguish between matter and mass.

2. Chemistry is the science that investigates and explains the structure and properties of matter.

3. How are the macroscopic level of matter and the submicroscopic level of matter interrelated?

4. Identify 3 types of models and why are they important?

5. Differentiate between qualitative and quantitative observations of matter.

6. Differentiate between pure substances and mixtures. Know two types of pure substances and the different types of mixtures. Be able to identify examples of each.

7. Explain a physical change vs a physical property and give an example.

8. Identify the parts of a solution.

9. Alloys are what type of solution? Give an example.

10. Why are elements important to life? How many naturally occurring elements are there? How are they organized?

11. How are elements and compounds related to one another? What does a compound formula tell us?

12. List several physical properties –

13. What is volatile? Give an example.

14. If I have 4.5 mL of a substance with a mass of 49.01 g, what is its density? How can you explain density in common terms?

15. If I have a block of metal, what steps do I take to determine its density?

16. How are chemical change, chemical property and chemical reaction related to one another? Give an example.

17. Differentiate between exothermic and endothermic reactions. Give an example of each.

Chapter 2

18. What were the earliest theories of matter describing?

19. What is the atomic theory?

20. The Modern Atomic Theory is comprised of many peoples' contribution to understanding the atom. Briefly explain each of the following contributors ideas.
a. Antoine Lavoisier (1743- 1794)

b. Joseph Prouse (1799)

c. John Dalton (1766 -1844)

d. J.J. Thomson ((1897)

e. Ernest Rutherford (1909)

f. Hantaro Nagaoka (1909)

g. Chadwich (1911)

f. Niels Bohr (1885- 1962)

21. Describe the difference between atomic mass, mass number and atomic mass unit.

22. Explain an isotope and identify how isotopes are different from one another by giving a specific example.

23. What is the electromagnetic spectrum? How is it important to atomic structure?

24. Explain each of the following:
      a. Lyman series (Ultraviolet series)

      b. Balmer series (Visible series)

      c. Paschen series (Infrared series)

25. What is the electron cloud model?

26. Explain the importance of valence electrons. How do Lewis dot diagrams explain the valence electrons?

Chapter 3
27. Explain the progression of the periodic table starting with
a. Dobereiner triads

b. Mendeleev's – 1st table

c.Mendeleev's updated table

d. Periodicity

e. Mendeleev predicts elements

f. Henry Moseley (1913)

g. The Modern Periodic Table

h. Periodic law

28. How is the periodic table related to the atomic structure?

29. Which group belongs to which name?
   a. Alkali Metals
   b. Noble gases
   c. Halogens
   d. Alkaline Earth Metals

30. Differentiate between:
   a. Metals

   b. Transition metals

   c. Inner Transition metals

   d. Nonmetals

   e. Metalloids

31. What uses to we have for semiconductors and where are they found on the periodic table? Give examples.

32. Briefly explain the relationship between elements, compounds and their properties. Illustrates with specific examples.
33. Explain how chemical stability is connected to the octet rule.

34. Explain ionic compound formation

35. What physical properties do ionic compounds tend to have compared to covalent compounds?

36. How can molecular or covalent compounds be formed?

37. Using Lewis dot diagrams, illustrate how more than 2 electrons can be shared at a time.

Chapter 5

38. What defines a binary compound?

39. Name the following compounds:
    MgCl2

    Na_2O

40. Write the formula for each of the following
    Barium and oxygen

    Aluminum and sulfur

    Lithium and chlorine

41. What is a polyatomic ion?

42. Name the following: (more practice on naming page 167)
    $CaCr_2O_7$

    $Ba(ClO_3)_2$

43. Write the formula for the following
    Magnesium sulfite

    Calcium Acetate

    Aluminum Sulfate

44. Name the following (transitions)
    FeO

    Cr_2O_3

45. Name the following hydrate
    $CaSO_4 \cdot 2H_2O$
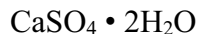
46. Explain a distillation

47. What is a molecular element and give 7 examples

48. Some elements form allotropes. What is an allotrope and give an example.

49. Describe the difference between an organic and inorganic compound.

48. Using the rules for naming covalently compounded substances, name the following compounds.
    a. S_2Cl_2
    b. CS_2
    c. SO_3
    d. P_4O_{10}

49. Write the formulas for each of the following:
   a. carbon tetrachloride
   b. iodine heptafluoride
   c. dinitrogen monoxide

50. Give the common name for each of the following substances:
   a. HCl
   b. C_3H_8
   c. NaOH
   d. NH_3
   e. H_3PO_4
   f. H_2SO_4

Chapter 6
51. Give the signs of a chemical reaction (5)

52. In the following chemical reaction, identify all the parts of the equation
$$2H_2O_{(l)} + energy \rightarrow 2 H_{2(g)} + O_{2(g)}$$
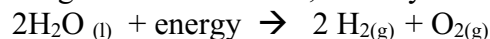
Coefficient   Yields
Subscript   Product
Phase   Reactant

53. If energy is absorbed as a part of the reactants, this reaction is said to be …

54. If energy is found on the products side of the reaction, it is said to be…

55. What is the law of conservation of matter and how is it important to chemistry?

56. In what ways may we see energy being given off during a reaction?

57. List the 5 major classifications of chemical reactions and illustrate it with an example.

58. Balance the following reactions:

a. $CH_{4(g)} + O_{2\,(g)} \rightarrow CO_{2(g)} + H_2O_{(g)}$
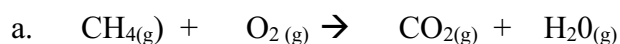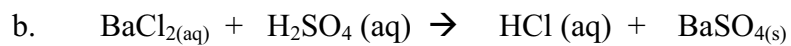
b. $BaCl_{2(aq)} + H_2SO_4 (aq) \rightarrow HCl (aq) + BaSO_{4(s)}$
* explain what $BaSO_{4(s)}$ is in the reaction

c. $Ag_2O_{(s)} \rightarrow Ag_{(s)} + O_{2(g)}$

59. Explain Le Chatelier's Principle – how might this apply to a reaction

60. How does activation energy influence a reaction?

61. Explain ways to manipulate the rate of a reaction with illustrations.

62. How is smore making an example of a limiting reactant?

63. Explain how a chemical reaction can be hastened or slowed down? What is used and what is it called?