Science 10- Course Review
Unit 1-Chemistry

Name _____

Date _____

Date due _____

The Science 10 Chemistry Unit covers:

- Chapter 8-Elements and the Periodic Table
- Chapter 9-Chemical Formulas and Compounds
- Chapter 10-Chemical Reactions

You can also consult the "Chemistry Outline" which shows all of the activities (Worksheets and Labs) If you don't have one or if you want to view or print any of the activities, go to the Science 10 Web page at http://sd67.bc.ca/teachers/dcolgur and click "Science 10"

1. When zinc metal is placed in a solution of hydrochloric acid, it fizzes producing hydrogen gas and zinc chloride.

   a) The reactants are _____

   b) The products are _____

   c) A word equation is: _____

2. In the following table, name the 3 major particles in the atom, state where they are located (in the nucleus or on the outside), state their relative mass compared to a proton (assume mass of a proton = 1) and their charge.

Particle	**Location**	**Mass** (*Proton = 1*)	**Charge**

3. List the four main points in John Dalton's **atomic theory**.

   1. _____

   2. _____

   3. _____

   4. _____

4. **Isotopes** of an element are two different forms which have the same number of _____ and _____, but with different numbers of _____.

5. The **atomic** _____ of an element is the average mass of the isotopes which occur in nature.

6. In a **neutral atom**, the number of **electrons** is always equal to the number of _____ or the _____ number.

7. According to the model of the atom proposed by Neils Bohr, electrons move around the atom in _____ or _____. When one orbit is filled, the electrons start filling the _____ orbit.

8. The first orbit holds _____ electrons.

   The second orbit holds _____ electrons.

   The third orbit holds _____ electrons.

9. Give the total number of electrons and the number of electrons in each orbit for each of the following elements:

Element	**Total # of electrons**	**Electrons in Level 1**	**Electrons in Level 2**	**Electrons in Level 3**	**Electrons in Level 4**
Aluminum (Al)					
Nitrogen (N)					
Calcium (Ca)					
Lithium (Li)					
Argon (Ar)					

10. Draw the **Bohr models** for neutral atoms of each of the following elements.

    a) oxygen

    b) chlorine

    c) phosphorus

    d) magnesium

11. According to Bohr, when a sample of an element is energized by heat or electricity, the electrons jump to _____ orbits. When they jump back down to lower orbits, they give off the energy in the form of _____. The amount of energy released in each jump corresponds to a certain _____ of light. The pattern of different colours of light given off is called the _____ for that element and can be seen through a device called a **spectroscope**. Because every element has its own set of electrons and orbits, the spectrum given off by each element will be _____ from that of any other element. What can this be used for? _____

    _____

12. What are some practical uses for pure oxygen? _____

    _____

    What is the main danger of pure oxygen? _____

13. Phosphorus is stored in _____. Suggest why? _____

    _____.

14. Why is phosphorus considered a dangerous element? _____

    Suggest a practical use for elemental phosphorus _____

15. In order to have the same number of electrons as the noble gas neon, sodium

    would have to _____ ____ electron.

    Sodium is stored in _____. Suggest why? _____

    _____.

16. Is potassium more or less reactive than sodium _____. Find rubidium on your periodic table. Do you think rubidium would be more or less reactive

    than potassium? _____.

17. Name iodine Symbol _____ Atomic number _____ # of electrons _____
    In order to have the same number of electrons as the noble gas xenon, iodine

    would have to _____ ____ electron. Is iodine a *metal* or *non-metal*?_____

18. Classify each of the following elements as an **alkali metal**, **alkaline earth**, **halogen**, **noble gas** or **transition metal**:

Element	**Family**
Fe	
Br	
K	
Kr	
Ba	
F	
Pt	
Li	
Ne	
Ra	

19. Mendeleev arranged the elements in order of _____ _____ and also put them in groups based on similar _____.

20. What did Mendeleev do when he came to a space where no known element would fit?

_____

21. Vertical columns of the Periodic Table are known as Groups or Chemical_____.

22. Elements are no longer listed in order of atomic mass, but in order of atomic _____.

23. What is similar about elements in the same family? _____

24. What is the main use of helium? _____

25. What are some uses of argon? _____

26. Where is neon used? _____

27. Where are krypton and xenon used? _____

28. Why is the element radon considered dangerous even though it is not chemically reactive?

29. What would alkali metal atoms need to do in order to end up with the same stable electron arrangements as the noble gases? _____

30. What can be said about the chemical reactivity of the alkali metals?_____

_____

31. When alkali metals are put into water, what happens?_____

_____

32. The outer orbits of halogen atoms each have _____ electrons. This is one (*more/less*) _____ than the nearest noble gas atom.

33. In order to achieve the stable arrangement of noble gas atoms, each halogen atom would have to _____ _____ electron.

34. Are the halogens metals or non-metals? _____

35. What can be said about the chemical reactivity of the halogens?_____

36. Why, other than reactivity, are halogens considered dangerous to work with?_____

37. Fill in the following table:

Indicators in Known Acids and Bases

Indicator	Colour in Acid	Colour in Base
Phenolphthalein		
Bromthymol Blue		
Red Litmus		
Blue Litmus		

38. Are the pH's of **Acid** Solutions < 7, >7 or = 7? _____

    Are the pH's of **Base** Solutions < 7, >7 or = 7? _____

39. The more **acidic** a solution is, the (*lower/higher)* the pH? _____

40. The more **basic** a solution is, the (*lower/higher)* the pH? _____

41. A solution with a pH = 7 is said to be _____

42. An acid **HCl** is mixed with a base **KOH**. Predict the **chemical formulas** for the two products of this reaction. _____ and _____. This type of reaction of an acid reacting with a base is called _____

43. List 4 properties (characteristics) **all acids** have in common:

    _____

    _____

    _____

    _____

44. List 4 properties (characteristics) **all bases** have in common:

_____

_____

_____

_____

45. What is the name of the acid found in sour milk? _____

46. What is the name of the acid found in pop? _____

47. What is the name of the acid found in lemons and grapefruit? _____

48. What is the name of the acid found in your stomach? _____

49. What is the name of the acid found in car batteries? _____

50. What is the name of the acid found in rhubarb? _____

51. What is the name of the acid found in apples? _____

52. What is the name of the acid found in vinegar? _____

53. What is the name of the base found in oven cleaner? _____

54. Acid spills can sometimes be neutralized by which common compound? _____

_____

55. Base spills can sometimes be neutralized by which common compound? _____

56. What is the chemical formula for common table salt? _____

57. What is the chemical name for baking soda? _____

58. What is the chemical formula for baking soda? _____

59. Which family of elements has just enough electrons in their highest orbits to completely fill them up? _____

60. If Lithium is combined with Fluorine, the Lithium atom will _____ an electron to the Fluorine atom.

61. When Fluorine has **gained** an electron, it now has ____ protons (*remember, it doesn't lose any protons*), and ____ electrons. Because protons are positive (+) and electrons are negative (-), the charge left over is _____. The Fluorine is no longer a neutral atom, but is a charged atom, which is called a Fluor**ide** _____.

62. Because the lithium ion (Li^+) and the fluoride ion (F^-) have opposite charges, they _____ each other. This attraction forms an _____ic bond.

63. Generally, ***combining capacity*** means the number of _____ an atom needs to **lose** or **gain** in order to have the same number of electrons as a _____ _____.

64. The combining capacity of chromium (III) is _____

The combining capacity of manganese (IV) is _____

The combining capacity of iron (II) is ……..... _____

The combining capacity of copper (I) is ……. _____

65. Use the Periodic Table and the method shown to you by the teacher to write the correct formulas for the following ionic compounds.

a) magnesium iodide .....

_____

b) aluminum fluoride .....

_____

c) calcium sulphide .....

_____

d) rubidium oxide .....

_____

e) sodium phosphide .....

_____

f) iron (III) sulphate .....

_____

g) manganese (IV) oxide .....

_____

h) copper (II) phosphate .....

_____

i) calcium nitrate .....

_____

j) ammonium chloride .....

_____

k) lithium oxalate .....

_____

l) nickel (III) carbonate .....

_____

m) copper (I) permanganate .....

_____

n) ammonium sulphate .....

_____

66. Compounds with only **two** elements are called _____ compounds.

67. In a **binary** compound, the non-metal changes it's name so it ends in the letters __ __ __.

68. In a compound containing a ***polyatomic ion,*** the name of the polyatomic ion *(always/sometimes/never)* _____ changes.

69. Write the correct names for the following ionic compounds Spelling counts!

a) Na_3PO_4 ..... _____

b) K_2S ..... _____

c) Rb_2SO_3 ..... _____

d) $(NH_4)_2CO_3$ ..... _____

e) $Ba(OH)_2$ ..... _____

f) $MgSO_4$ ..... _____

g) Cs_2HPO_4 ..... _____

h) $NaHCO_3$ ..... _____

i) $AgNO_3$ ..... _____

j) Na_3As ..... _____

k) NH_4NO_3 ..... _____

l) $Ag_2Cr_2O_7$ ..... _____

70. In an ***ionic compound***, electrons are _____ from one atom to the other. The element that lost electron(s) becomes a (+/-) _____ ion and the element than gains electron(s) becomes a (+/-) _____ ion. The two oppositely charged ions now (attract/repel) _____ each other.

71. In a ***covalent*** compound, one atom _____ electrons with another atom.

72. Show the Bohr model for a molecule of F_2.

73. Give the formulas for molecules of the seven diatomic elements. The first one is H_2.

_____

74. Draw the Bohr model for a molecule of ammonia (NH_3).

75. Write the correct formulas for the following **covalent** compounds:

a) nitrogen trioxide .....

b) silicon tetrafluoride .....

c) nitrogen monoxide .....

d) selenium hexafluoride .....

e) phosphorus pentachloride .....

f) sulphur dioxide .....

g) dinitrogen tetroxide .....

76. Write the correct names for the following **covalent** compounds:

a) PF_5 ..... _____

b) SO_3 ..... _____

c) ClF_6 ..... _____

d) SeO_2..... _____

e) N_2O ..... _____

f) N_2Cl_4 ..... _____

77. What is meant by a *physical* change? _____

Give 3 examples of physical changes:

_____

_____

_____

78. What is meant by a *chemical* change? _____

Give 3 examples of chemical changes:

_____

_____

_____

79. Balance the following equations by putting the proper coefficients wherever they are needed.

a) $Sr + O_2 \rightarrow SrO$

b) $Al + H_2O \rightarrow Al(OH)_3 + H_2$

c) $Al + O_2 \rightarrow Al_2O_3$

d) $C_5H_{12} + O_2 \rightarrow CO_2 + H_2O$

e) $Na + H_2O \rightarrow H_2 + NaOH$

f) $NaClO_3 \rightarrow NaCl + O_2$

g) $Ca(NO_3)_2 + (NH_4)_2SO_4 \rightarrow CaSO_4 + NH_4NO_3$

h) $C_2H_5OH + O_2 \rightarrow CO_2 + H_20$

i) $Al(NO_3)_3 + K_2CrO_4 \rightarrow Al_2(CrO_4)_3 + KNO_3$

j) $NH_3 \rightarrow N_2 + H_2$

k) $C_6H_6 + O_2 \rightarrow CO_2 + H_2O$

l) $S_8 + O_2 \rightarrow SO_2$

m) $HNO_3 + Fe(OH)_3 \rightarrow H_2O + Fe(NO_3)_3$

n) $Br_2 + CaCl_2 \rightarrow CaBr_2 + Cl_2$

o) $Mg + AlCl_3 \rightarrow MgCl_2 + Al$