NAME: BLOCK:

CHEMISTRY I HONORS MID-COURSE REVIEW

Chapter 1: Matter & Change

1) Define the following: and Give Examples

A. an atom smallest piece of an element that retains all properties

B. an element – A type of matter that cannot be separated by physical or chemical means -Gold

B. a compound – two or more elements that have been chemically bonded and can only be separated by a chemical reaction. H_2O

C. a homogenous mixture –two or more substances that have been uniformly combined and can be separated by physical means. Salt water

D. a heterogeneous mixture- two or more substances that are not uniformly combined and can be separated by physical means. Pizza

E. physical property- A property of matter that can be determined without changing the matter to something new - color

F. chemical property- A property of matter that cannot be determined without changing the matter to something new - flammability

G. Intensive Property A property of matter that is not determined by how much but is determined by the identity of the material - color melting point

H. Extensive Property A property of matter that is determined by how much but not determined by the identity of the material – volume mass length

2) How would you determine the difference between endothermic and exothermic reactions? Measure the temperature change endothermic takes in heat (gets cold) exothermic gives off heat (gets hot)

3) What are the four indications of a chemical reaction? 1 Bubbles- gas 2 change temp 3 makes a precipitate 4 change color

4) Describe the phases of in terms of particle packing, volume, shape, amount of average kinetic energy?

A. solid tightly packed fixed volume and shape low energy

B. liquid loosely packed, fixed volume, indefinite shape, more energy than solids

C. gas not packed, indefinite volume, indefinite shape, more energy than liquids

5) Please separate a mixture of sand, iron, and salt. Classify the material at each step of the separation. Start heterogeneous mix 1 use magnet to remove iron (element) mix still (Het) 2 Add water to dissolve salt (Het) 3 Filter out sand (Het) left with salt water (Hom) 4 evaporate water (compound) left with salt (compound)

Chapter 2: Measurements & Calculations

6) How many significant figures are in the following: A. 506.00 mL 6 B 60.0 mL 3 C. 0.02037 mL 4 D. 4.0×10^9 mL 2

7) What are the SI units prefixes and meaning arranged in order from smallest to largest? Kilo (k) 1000 hecta (h)100 Deca (da) 10 Base 1 deci (d) .1 Centi (c) .01 Milli (m) .001

8) Can you determine the density of a metal sample using only a balance and a graduated cylinder. The student obtained the data shown:

	Volume (mL)	Mass (g)
Empty Graduated Cylinder	0.0	47.16
Cylinder and Water	50.0	67.16
Cylinder, Water and Metal Cube	102.0	297.50

D =M/V = (297.50 -67.16)/ 102.0-50)= 230.34/52= 4.430g/ml

9) Why is density important to a chemist? Can be used to identify a material since it is an intensive property

Chapter 3: Atoms

10) A. What is the law of definite proportions?
That the same compound is always made of the same atoms in the same amounts regardless of source

B. What is the law of multiple proportions?
That the same elements can be used to make multiple compound if combined in different amounts.

C. What is the Law of Conservation of Matter?
That matter cannot be created or destroyed in a closed system by normal chemical reactions

A student heated a sample of potassium chlorate in a crucible and collected the data below:

Mass of Crucible	25.525 grams
Mass of Crucible and Sample before the reaction	30.615 grams
Mass of Crucible and Product after the reaction	28.629 grams

B) Did the student prove the Law of Conservation of Matter? NO

C) What do you think happened in the reaction? Gas escaped

D) should there be a change to the design of the experiment? Yes trap the gas to be weighed

11) Which elements on the periodic table can form:
- A) an anion that contains 10 electrons, 10 neutrons, and 9 protons? Flourine
- B) a cation with 10 electrons, 12 neutrons, and 11 protons Sodium

12) A) What do element in the same group have in common? The same number of valence electrons and very similar properties

B)What do elements in the same period have in common? Elements in the same period tend to have the same number of energy levels

13) Describe in terms of mass, charge, and location:
- A. electron almost no mass neg charge located in electron cloud determine size
- B. neutron mass of 1 no charge located in nucleus determine mass
- c. proton mass of 1 positive charge located in nucleus determine mass

14) What where the contributions of the following Scientists:
- A. Bohr gave a model of atom
- B. Miliken mass of electron
- C. Dalton atomic theory
- C. Rutherford found nucleus and proton
- D. Thompson found electron

Chadwick found neutron

Chapter 4: Electron Arrangement

15) What are the electron configurations for the following elements:
- A. Lithium $1s^2\ 2s^1$
- B. Fluorine $1s^2\ 2s^2 2p^5$
- C. Neon $1s^2\ 2s^2 2p^6$
- E. Copper $1s^2\ 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$

16) What do the four quantum numbers describe
- A. Principal Quantum Number (n) distance from nucleus – energy level
- B. Angular Momentum Quantum Number (l) type and shape of orbital
- C. Magnetic Quantum Number (m_l) 3D orientation of orbital

D. Spin Quantum Number (m_s) direction of electron's spin

17) How many electrons are needed to completely fill the following energy levels?

A. 1 - 2

B. 2 - 8

C. 3 - 18

D. 4 - 32

18) Describe how an atom can emit colored light. First an electron must absorb energy to be moved from a ground state to an excited state. This is temporary the electron will release the absorbed energy often in the form of colored light. Color depends of amount of energy released since color is based on wavelength which is set by energy

19) Which is a greater transition a red color or purple color? Explain. Red is a higher wavelength meaning it has a lower frequency and results in lower energy than purple

20) Describe a simple method chemists can use to determine the metal contained within a salt.

They can excite the salt in a flame and observe the color generated since metal salts have characteristic flame colors. For a better id a spectroscope can be used to separate the color into wavelengths

Lab Questions : Identify & use

A. a beaker - hold and gently heat materials and reactions

B. a flask – hold and heat materials where splattering may occur

C. a graduated cylinder used to measure volume

E. a thermometer measure temperature

F. A digital balance measure mass

27) What are the contributions of the following
A. Bohr – model of Atom idea of energy levels
B. Mendeleev Table based on Atomic mass & Prop
C. Mosely Table based on Atomic #

28) A) Explain what is the most reactive metal is Fr biggest loose hold on e^-

B) non-metal He smallest tight hold on e^- already has full valance shell

Lab Questions : Identify & use
A. a beaker
B. a flask
C. a graduated cylinder
E. a thermometer
F. A digital balance

Computations:

1. calcium phosphate has the chemical formula $Ca_3(PO_4)_2$. According to the formula, what is the **percent metal** in the compound?

$3(40.08) + 2(30.97) + 8(16) = 310.18$

$\frac{}{310.18} = 38.7\%$

2. Aluminum Sulfate has the chemical formula $Al_2(SO_4)_3$. What is the **molar mass** of the compound?

$2(26.98)\ 3(32.06) + 12(16) = 341.96$

3. If **3.50 moles** of calcium hydroxide ($Ca(OH)_2$) are needed for an experiment, how many **grams** should be massed out?

$40.08 + 2(16) + 2 = 74.08$ 3.5

259.28

4) **45.0 grams** of carbon dioxide gas (CO_2) escape from a leaky container How many **moles** of the gas were lost?

$\frac{45.0}{12.2(16)} = 1.02$

5. **2.25×10^{23} atoms** of Magnesium (**Mg**) are need to react in an experiment, how many **grams** should be massed out

$\frac{2.25^{23}}{6.022}$ $.374 \times 24.31 = 9.08$

6) If 2.23×10^{24} molecules of oxygen gas were used in an experiment, how many grams were consumed?

$\frac{2.23^{24}}{6.022^{23}}$ $3.70 \times 32 = 118.5$ 119

7) water has a specific heat of 4.184 J/g°c. How much energy is required to heat 50.0 grams of water at 22.0°c to 80.0°c?

$Q = 4.184 \times 500 \times (50-22) = 12134\ J$

8) what is the specific heat of a material if 5.507×10^{-2} pounds of the material required 96.25 joules of energy to raise the temperature from 20.0°c to 30.00°c?

.055071lbs $\frac{1}{2.204}$ = .02725

$C = \frac{96.25}{.0272(10)} = .3539\ \frac{J}{g°C}$

9. Find the formula and name the hydrate for barium chloride $BaCl_2 * ? H_2O$

Mass of Crucible	17.522 grams
Mass of Crucible and hydrate	33.802 grams
Mass of Crucible and anhydrous material	31.402 grams

16.28

13.88

2.42

$\frac{12.38}{137.33+70.9} = .0667$ $\frac{2.42}{15} = .188$ $\frac{.133}{.0667} = 1.99$

10. 356.2 grams of a 86.5% pure Barium Chloride $BaCl_2$ are massed out. How many moles of chloride ions are used?

Barium Chloride d. hydrate $BaCl_2 \cdot 2H_2O$

$\frac{356.2}{137.3+70.9} = 1.71$ $BaCl_2$ Pure

grams pure / grams impure = % / 100

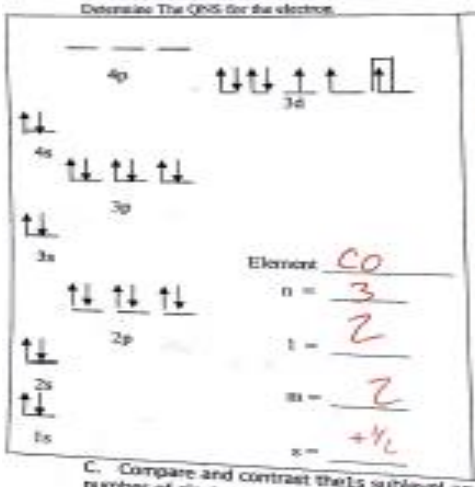
$100(x) = 86.5(356.2)$

$x = 308.1$ grams pure

moles $= \frac{308.1}{137.3+70.9} = 1.480$ mole

2.96 moles

10 A Please determine the element below and Determine The QNS for the electron



Element Co

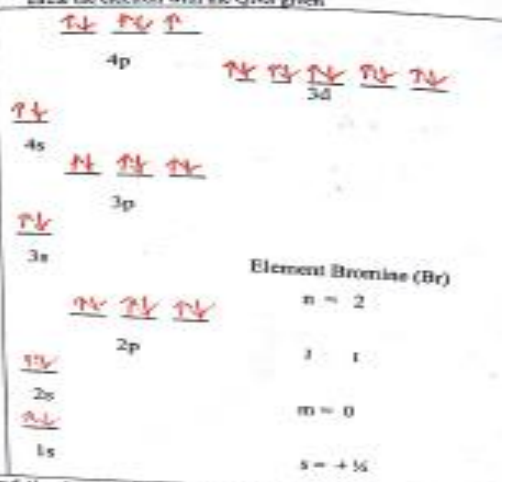
n = 3

l = 2

m = 2

s = +½

10B. Please Draw the Energy Diagram and circle the electron with the QNS given



Element Bromine (Br)

n = 2

l = 1

m = 0

s = +½

C. Compare and contrast the1s sublevel and the 2s sublevel in terms of shape, energy, number of electrons that fill. Compare and contrast the 2s and 2p sublevels

D Why are line emission spectrums and why are they important to chemists?

E. What element has the electron configuration : $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$? Ti

F. Write the electron configuration for Bromine: $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6 4s^2 3d^{10} 4p^5$

G. What is [Ne] $3s^2$ N/A

H. What is the NGEC for Copper: [Ar] $4s^1 3d^{10}$ deviant d

C) 1S & 2S both SPHERES but 2S is A bigger sphere since higher Energy

d) bands of light given off when Excited electrons return to their ground state. They are like fingerprints Id the Elements

Page 4 of 4