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Subject - **7th Chemistry** – Teacher: **Mrs. Raj**
Date:_____

7th grade – Chemistry – Pre-comprehensive exam study guide

Pre-comprehensive format - Multiple choice questions

Study suggestions

- Your old tests and quizzes will help you study, but be sure to focus on concepts
- Go through the materials from the beginning of school year and make an outline of what we covered from your notes. Make it fairly simple, with definitions and examples for each key idea.
- Get lots of sleep and eat a good breakfast on the test days.
- Good luck!

Topics:

Significant figures

- Measurement and significant figures

Properties of matter

- Types of matter – elements vs compounds
- Properties of elements vs. compounds
- Mixtures – Homogeneous and heterogeneous

Periodic table

- Electron configuration for elements 1 – 20
- Long hand electron configuration for ions
- Periodic trends – atomic radii, ionic radii, and ionization energy

Chemical bonding

- Ionic bonding – Nomenclature of binary ionic compound, compounds w/transition metals, compounds with polyatomic ions.
  Poly-atomic ion list – nitrate, sulfate, phosphate, carbonate, hydroxide, ammonium, nitrite, sulfite, hypochlorite, chlorite, chlorate, perchlorate.
- Covalent bonding – Nomenclature, Lewis dot symbols and Lewis structures. Construct structures for compounds only for the following combination of elements: H,C,N,O,P,S and the halogens.

Chemical reactions

- Balancing chemical reactions

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Vocabulary

Properties of matter

- Element
- Compound
- Homogeneous mixture
- Heterogeneous mixture
- Physical property
- Chemical property
- Physical change
- Chemical change
- States of matter
- Solid
- Liquid
- Gas

Periodic table

- Period
- Group
- Metal
- Non-metal
- Metalloid
- Alkali metal
- Alkaline earth metal
- Noble gas
- Halogen
- Atom – proton, electron, neutron
- Valence electron
- Core electron
- Ion
- Isotope
- Electron configuration
- Atomic radii
- Ionic radii
- Ionization energy
- Effective nuclear charge, Zeff

Chemical bonding

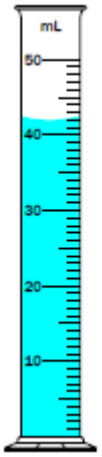
- Ionic bond
- Covalent bond
- Nomenclature
- Polyatomic ions
- Lewis dot symbols
- Lewis structures

Chemical reactions

- Law of conservation of mass
- Balancing chemical equations

Practice Problems

1. Laboratory and significant figures
   a. Read the volume of the graduated cylinder in mL



_____mL

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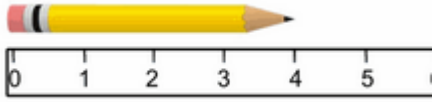
b. Find the length in cm



_____ cm

c. How many significant figures in the following:
   i. 4.50020 mg _____
   ii. 0.001023 seconds_____
   iii. 43.1 mL _____
   iv. 55 cats _____
   v. 11.1 g _____

2. Properties of matter
   a. How will you differentiate between an element and a compound?

   b. What are the two types of mixtures?

   c. Draw a particle diagram to differentiate between a compound and a mixture.

   d. Identify the solute and the solvent in lead(II) nitrate solution.

3. Periodic table
   a. Write the electron configuration for the following and identify the number of valence electrons in each.
      i. Cl _____ _____
      ii. Na _____ _____
      iii. Mn _____ _____
      iv. Li+ _____ _____

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b. What is atomic number?

c. What is mass number?

d. Identify the mass number and the atomic number for the element $^{12}_{6}C$.

e. Identify the number of protons, electron and neutrons in Cobalt-60.

f. What is a period in a periodic table? How many periods are there?

g. What is a group in a periodic table? How many groups are there?

h. How are elements arranged in a periodic table? Where are metals, nonmetals, and metalloids located?

i. What is the general trend in atomic radius as you go down a group? Explain.

j. Arrange Al, Mg, Si and P in the increasing (smallest to largest) order of size.

k. What is ionization energy?

l. What is the general trend in ionization energy as you go down a group? Explain.

m. Arrange Li, Na, K and Rb in the increasing (smallest to largest) order of ionization energy.

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n. Circle the atom or ion that has the largest radius.
   i. Na or Na^{+1}
   ii. Al^{3+}or Al
   iii. Cl^{-1} or Cl
   iv. O^{2-} or O

4. Chemical Bonding

a. Identify whether the following are ionic or covalent and write their names
   i. $NaNO_3$ – _____ _____
   ii. PbI_2 - _____ _____
   iii. CS_2 – _____ _____
   iv. NO – _____ _____

b. Write the names of the following compounds
   i. $CoSO_4$ -_____
   ii. $Ca_3(PO_4)_2$ - _____
   iii. Cr_2O_3 -_____
   iv. CCl_4 -_____

c. Write the formula of the following compounds
   i. Aluminum hydroxide -_____
   ii. Potassium nitride -_____
   iii. Zinc bromide -_____
   iv. Iodine monochloride -_____
   v. Dinitrogen tetroxide -_____

d. Draw the Lewis structures for the following compounds.
   i. PBr_3

   ii. CH_4

   iii. H_2O

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iv. BF_3

v. NH_3

5. Chemical reactions

a. State the law of conservation of mass.

b. Balance the following equations

i. ____ Al + ____ $O_2 \rightarrow$ ____ Al_2O_3

ii. ____ Cu + ____ $AgNO_3 \rightarrow$ ____ Ag + ____ $Cu(NO_3)_2$

iii. ____ Zn + ____ HCl $\rightarrow$ ____ $ZnCl_2$ + ____ H_2

iv. ____ Fe + ____ $Cl_2 \rightarrow$ ____ $FeCl_3$