

Chapter 2 Study Questions

- Which law is supported by each of the following statements? (The laws are: conservation of mass, definite proportion, and multiple proportions.)
 - In hydrogen peroxide there are 15.9 grams of oxygen per 1.00 g of hydrogen and in water there are 7.94 grams of oxygen per 1.00 g of hydrogen.
 - The total mass of reactants (starting materials) is the same as the total mass of products when a chemical reaction is carried out in a closed system.
 - In any sample of a given compound, the mass proportion of each element is the same.
- What are two conclusions supported by Rutherford's experiment?
- Fill in the following table:

Nuclear Symbol	Atomic Number	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons	Charge
${}_{18}^{40}\text{Ar}$	_____	_____	_____	_____	_____	_____
_____	_____	39	19	18	_____	_____
_____	16	_____	_____	_____	20	-2

- Write the nuclear symbols for the isotopes of neon which contain 10 neutrons and 12 neutrons.
- For each of the following elements, indicate whether it is a main group element (MG), transition metal (TM), or inner transition metal (ITM). If the element is a main group element, indicate the group number and whether it is a metal, a nonmetal or a metalloid. Also indicate the Period of each element.
 - Sr (atomic # 38)
 - Br (atomic # 35)
 - Mo (atomic # 42)
 - P (atomic # 15)
 - B (atomic # 5)
 - U (atomic # 92)
 - Sn (atomic # 50)
 - Hg (atomic # 80)
- Provide the common names of Groups 1, 2, 17 and 18.
- Give an example of at least one element made up of molecules and one compound made up of molecules.
- For each of the following atoms, indicate whether it forms a positive or a negative ion, and include the ion charge.
 - Na
 - Ba
 - Cl
 - S
 - Ag

9. Which of the following are ionic compounds? Which are covalent compounds? Name each compound.
- | | | | |
|-----------|------------|-----------------|--------------|
| a) N_2O | b) K_2O | c) PCl_3 | d) $AlPO_4$ |
| e) HCl | f) NH_4F | g) $Pb(NO_2)_2$ | h) H_2SO_3 |
10. Name the following ionic compounds:
- | | | | |
|-------------|----------|-----------|------------------|
| a) $CaCO_3$ | b) ZnS | c) $CuOH$ | d) $Mg(ClO_4)_2$ |
|-------------|----------|-----------|------------------|
11. Give the formulas for the following ionic compounds:
- | | |
|-------------------------|---------------------|
| a) potassium phosphate | b) ammonium sulfate |
| c) cobalt(II) hydroxide | d) iron(III)nitride |
12. Provide the formulas for the following covalent compounds:
- | | | |
|-------------------------|-------------------------|-----------------|
| a) phosphorus triiodide | b) dinitrogen pentoxide | c) chloric acid |
|-------------------------|-------------------------|-----------------|

Summary of Chapter 2: Atoms, Molecules and Ions

law of conservation of mass

law of definite proportion

law of multiple proportions

atomic theory

Rutherford's experiment

structure of atom

nucleus

protons, electrons, neutrons

atomic number

mass number

isotopes

nuclear symbol

molecules

ions

periods & groups

regions of the Periodic Table: main groups, transition metals, inner transition metals,

noble gases, halogens, alkali metals, alkaline earth metals

metals, nonmetals, metalloids

ionic & covalent compounds

names of ionic compounds

names of binary covalent compounds

names of acids

formulas of compounds from name