HW04 - Introduction to Compounds

1 4 points

Complete the sentence regarding the energy levels of an electron in the hydrogen atom. As the principal quantum number increases,

- ○ the energy levels remain degenerate
- ○ the spacing between successive energy levels remains constant
- ○ the spacing between successive energy levels increases
- ○ the spacing between successive energy levels decreases

2 4 points

Which of these atoms have unpaired electrons?

- ☐ oxygen
- ☐ neon
- ☐ nitrogen
- ☐ magnesium

3 4 points

How many total electrons are in the oxide anion?

- ○ 4
- ○ 6
- ○ 12
- ○ 10
- ○ 8

4 4 points

The metal Ca and the nonmetal Br form an ionic bond. What is the formula for this ionic compound?

- ○ $CaBr_2$
- ○ Ca_2Br_3
- ○ CaBr
- ○ Ca_2Br
- ○ Ca_3Br_2

5 4 points

Strontium (Sr) and chlorine (Cl) come together to make a bond. What type of compound is formed and what is its formula?

- ○ Covalent, Sr_2Cl_2
- ○ Ionic, SrCl
- ○ Ionic, $SrCl_2$
- ○ Covalent, $SrCl_2$

6 4 points

An example of iron oxidizing to form rust involves oxide forming an ionic compound with iron(III). What is the formula of this ionic compound?

- ○ Fe_3O_2
- ○ Fe_2O_3
- ○ FeO_3
- ○ Fe_2O_4
- ○ FeO

7 4 points

Cobalt(II) forms an ionic compound with hydroxide. What is the formula for this compound?

- ○ $Co(OH)_2$
- ○ $CoOH_2$
- ○ OH_2Co
- ○ $Co(OH)_3$
- ○ CoOH

8 4 points

What is the formula for magnesium phosphate?

- ○ $Mg_3(PO_3)_2$
- ○ $Mg(PO_4)_2$
- ○ $Mg_3(PO_4)_2$
- ○ Mg_3PO_4
- ○ $MgPO_4$

9 4 points

What is the formula for sodium phosphite?

- ○ Na_2PO_3
- ○ $NaPO_3$
- ○ Na_3PO_4
- ○ $Na(PO_3)_3$
- ○ Na_3PO_3

10 3 points

What is the name of Na_2S?

- ○ sodium sulfate
- ○ sodious sulfous
- ○ sodium sulfide
- ○ disodium sulfide
- ○ disodium sulfurous
- ○ sodium sulfite

11 4 points

Compared to a nonmetal in the same period, a metal is more likely to _____ its valence shell and form a _____.

- ○ fill, cation
- ○ empty, anion
- ○ empty, cation
- ○ fill, anion

12 4 points

Select the ionic compound with the strongest theoretical ionic bond strength.

- ○ NaI
- ○ KF
- ○ NaF
- ○ KCl

13 4 points

Select the ionic compound with the highest theoretical lattice energy.

- ○ $MgCl_2$
- ○ CaI_2
- ○ MgI_2
- ○ $CaBr_2$

14 3 points

A stronger ionic bond is typically associated with the ions having...

select all that apply

- ☐ larger ionic radii
- ☐ greater charge density
- ☐ larger charges
- ☐ smaller ionic radii

15 4 points

The range of atomic radii for small to large atoms is approximately...

- ○ .5 to 300 Å
- ○ 1 to 1000 Å
- ○ 50 to 300 Å
- ○ .5 to 3 Å
- ○ 40 to 5000 Å

16 4 points

Which of the following best ranks the neutral elements P, Ge, and O from smallest to largest atomic radius?

- ○ O < Ge < P
- ○ Ge < P < O
- ○ Ge < O < P
- ○ P < O < Ge
- ○ O < P < Ge

17 4 points

The smallest atomic radius in a particular period will be the...

- ○ alkaline earth metal
- ○ halogen
- ○ noble gas
- ○ alkali metal

18 4 points

Which of the following species is most likely to lose an electron to form a cation?

- ○ Carbon
- ○ Oxygen
- ○ Sodium
- ○ Fluorine

19 4 points

Which of the following is expected to have the highest electronegativity?

- ○ Magnesium
- ○ Sodium
- ○ Chlorine
- ○ Carbon

20 4 points

Hydrofluoric acid, HF, makes a polar covalent bond. Which of the following best describes the bond?

- ○ There is an unequal sharing of electrons, resulting in a partial negative and partial positive
- ○ There is an equal sharing of electrons, resulting in completely neutral charges on each atom
- ○ There is an equal sharing of electrons, resulting in a partial negative and partial positive
- ○ There is an unequal sharing of electrons, resulting in completely neutral charges on each atom

21 4 points

A bond between two nonmetals involves the sharing of electrons. However, one of the atoms has a higher electron affinity, meaning it attracts the electrons in the bond more than the other atom. What type of bond is this?

- ○ Pure Covalent
- ○ Polar covalent
- ○ Ionic
- ○ Metallic

22 6 points

Select all the covalent compounds below:

- ☐ Br_2
- ☐ CH_4
- ☐ CO_2
- ☐ CaO
- ☐ H_2O
- ☐ NH_3
- ☐ LiBr
- ☐ HCl

23 4 points

Select all the compounds below that have ionic bonds.

- ☐ NaCl
- ☐ HBr
- ☐ $MgCl_2$
- ☐ LiBr
- ☐ CH_3OH
- ☐ H_2O
- ☐ $FeCl_3$

24 4 points

Which type of bond is found in each of the following compounds?
HBr
I_2
LiBr

- ○ HBr: ionic
I_2: covalent
LiBr: covalent
- ○ HBr: ionic
I_2: covalent
LiBr: ionic
- ○ HBr: covalent
I_2: covalent
LiBr: ionic
- ○ HBr: covalent
I_2: ionic
LiBr: covalent

25 4 points

What are the bonds in the following molecules?
HCl
Br_2
KCl

- ○ HCl: covalent
Br_2: covalent
KCl: ionic
- ○ HCl: ionic
Br_2: ionic
KCl: covalent
- ○ HCl: ionic
Br_2: covalent
KCl: covalent
- ○ HCl: ionic
Br_2: covalent
KCl: ionic