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Question 1

0.5 points

An atom loses an electron to another atom. Is this an example of a physical or chemical change?

Physical change involving the formation of positive ions.

Chemical change involving the formation of positive ions.

Chemical change involving the formation of negative ions.

Physical change involving the formation of negative ions.

Question 2

0.5 points

In terms of the periodic table, is there an abrupt or gradual change between ionic and covalent bonds?

Whether an element forms one or the other depends on nuclear charge and not the relative positions in the periodic table.

There is a gradual change: the farther apart, the more ionic.

An abrupt change that occurs across the metalloids.

Actually, any element of the periodic table can form a covalent bond.

Question 3

0.5 points

Atoms of nonmetallic elements form covalent bonds, but they can also form ionic bonds. How is this possible?

This happens when one of the bonded nonmetallic elements has a strong electronegativity.

It happens when one of the nonmetallic elements loses an electron to become a positive ion.

An ionic bond results when a nonmetallic element loses an electron to a metallic element.

An ionic bond results when a nonmetallic element gains an electron from a metallic element.

Question 4

0.5 points

Phosphine is a covalent compound of phosphorus, P, and hydrogen, H. What is its chemical formula?

PH

P₂H₃

H₂P

PH₃

Question 5

1 points

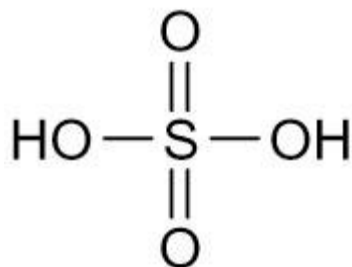
How many electrons are used to draw the electron-dot structure for hydrogen peroxide, a covalent compound with the formula H_2O_2 ?

- 4
- 7
- 14
- 8

Question 6

1 points

In two dimensions sulfuric acid, H_2SO_4 , is often written as shown below. What 3-dimensional shape does this molecule most likely have?



- Square pyramidal
- Square planar
- Tetrahedral
- Octahedral

Question 7

0.5 points

The source of an atom's electronegativity is the _____.

- effective nuclear charge.
- kinetic energy electrons have orbiting the nucleus.
- repulsive force occurring between electrons within neighboring shells.
- repulsive force occurring among electrons within the same shell.

Question 8

1 points

Which molecule is most polar:

- $\text{S}=\text{C}=\text{S}$
- $\text{O}=\text{C}=\text{S}$
- These all have the same polarity.
- $\text{O}=\text{C}=\text{O}$

Question 9

1 points

List the following bonds in order of increasing polarity:

- $\text{N}-\text{O} < \text{N}-\text{N} < \text{N}-\text{F} < \text{H}-\text{F}$
- $\text{N}-\text{N} < \text{N}-\text{O} < \text{N}-\text{F} < \text{H}-\text{F}$

H-F < N-F < N-O < N-N

N-N < N-O < H-F < N-F

Question 10

1 points

Water, H₂O, and methane, CH₄, have about the same mass and differ by only one type of atom. Why is the boiling point of water so much higher than that of methane?

The water molecule is less symmetrical than is the methane molecule.

The oxygen of a water molecule has two lone pairs of electrons.

The electronegativity difference between oxygen and hydrogen is greater than the electronegativity difference between carbon and hydrogen.

All of the above.

Question 11

1 points

Why doesn't the sodium atom gain seven electrons so that its third shell becomes the filled outermost shell?

Only six additional electrons are required to fill the outermost shell of sodium.

In gaining seven more electrons, sodium's fourth outer shell becomes filled.

Because of the difficulty another atom would have losing seven electrons.

Sodium's nuclear charge is not strong enough to hold that many more electrons.

Question 12

1 points

Barium ions carry a 2+ charge, and nitrogen ions carry a 3- charge. What would be the chemical formula for the ionic compound barium nitride?

Ba₃N₂

Ba₃N₄

Ba₂N₂

Ba₂N₃

Question 13

0.5 points

The neon atom tends NOT to gain any additional electrons because

_____.

of the repulsions they would experience with electrons in the same shell.

its nuclear charge is not great enough.

that would result in a positive ion.

there is no more room available in its outermost occupied shell.

Question 14

0.5 points

A hydrogen atom does not form more than one covalent bond because it

_____.

has only one electron to share.
has such a strong electronegativity.
loses its valence electron so readily.
has only one shell of electrons.

Question 15

0.5 points

Carbon dioxide has two polar bonds between carbon and oxygen. Why then is carbon dioxide a nonpolar molecule?

Because carbon dioxide is produced in plants that generally have low polarity molecules.

Because carbon dioxide attaches to itself and forms a three-dimensional structure that has no overall polarity.

Because carbon dioxide is a gas and therefore does not bond tightly to its neighbors.

Because these two polar bonds are opposite (180 degrees) to one another and cancel one another out.

Question 16

How does an ionic bond differ from a covalent bond?

A covalent bond is composed of two sets of electrons (a double bond) whereas an ionic bond is composed of only one set (a single bond).

An ionic bond results from a pure electrostatic interaction between oppositely charged ions, whereas electrons are shared in a covalent bond.

A covalent bond results from a pure electrostatic interaction between oppositely charged ions, whereas electrons are shared in an ionic bond.

An ionic bond has electron/proton attractions whereas a covalent bond involves only electrons.

Question 17

1 points

The Lewis dot structure of H_2S , reveals that it has two lone pair of electrons and two bonds (each to a hydrogen) around the central sulfur atom. According to VSEPR theory, what molecular *geometry* will it have?

The answer should be "bent" because it asks for the molecular geometry.

None of these answers are right. The electron domain geometry is tetrahedral, not the molecular geometry.

octahedral

Trigonal pyramid

Tetrahedral

Linear

Question 18

0.5 points

What ionic compound would you expect to form between aluminum and sulfur?

Al_2S_3

AlS

Al₂S
AlS₃

Question 19

1 points

Why is the existence of the Ca³⁺ ion never observed?

Because the gain of three electrons would give the calcium ion the electron configuration of vanadium.

Because the loss of three electrons would give the calcium ion the electron configuration of chlorine.

Because the gain of three electrons would give the calcium ion the electron configuration of chlorine.

Calcium does have a charge of +3 in some instances.

Question 20

0.5 points

What is the main difference between an ionic and a covalent bond?

One is the sharing of a pair of electrons, the other is the transfer of at least one electron.

One involves electrons, the other does not involve any electrons.

The electrons in both types of bonding undergo an exchange.

The electrons are traded between the two atoms and this keeps the atoms close.

Both bonds are the same, but named different to describe different atoms involved.

Question 21

0.5 points

How many covalent bonds would the following atom usually form?



3

2

1

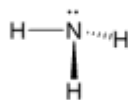
5

would usually not form any covalent bonds

Question 22

0.5 points

What is the molecular *geometry* of the following molecule?

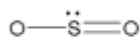


Answer should be trigonal pyramidal. Tell your teacher to review the difference b/w molecular and electron domain geometries.

linear
triangular
tetrahedral
octahedral
rectangular

Question 23

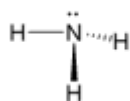
What is the molecular *shape* of the following molecule?



pyramidal
bent
tetrahedral
T-shaped
linear

Question 24

What is the molecular *shape* of the following molecule?

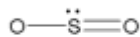


>

- Triangular pyramidal
- bent
- tetrahedral
- T-shaped
- linear

Question 25

What is the molecular *geometry* of the following molecule?



linear
triangular

tetrahedral
octahedral
rectangular

Question 26

What is the molecular *shape* of the following molecule?



pyramidal
bent
tetrahedral
T-shaped
linear

Question 27

Which of the following molecules contains a polar bond?

H-F
Cl-Cl
H-H
F-F
all of these

Question 28

0.5 points

Which of the following molecules would be polar (contain a dipole)?

H-F
Cl-Cl
H-H
F-F
all of these

Question 29

0.5 points

Which of the following bonds would be the most polar?

C-F
C-Cl
C-Br
C-I
All are equally polar.

Question 30

0.5 points

Which of the following bonds would be the least polar?

C-F

C-O

C-Cl

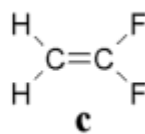
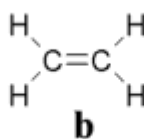
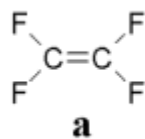
C-H

All are equally polar.

Question 31

2 points

Which of the following molecules is polar?



>

a

b

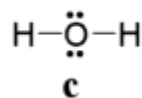
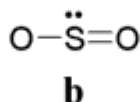
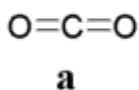
c

All are polar.

Only a and c are polar.

Question 32

1 points



Which of the above substances would have the lowest boiling point?

a

b

c

All boil at the same temperature.

All are gases.

Question 33

1 points

Two molecules, A and B, have very different physical properties. A and B do not mix. Molecule A boils at 80°C and freezes at -30°C. Molecule B boils at 35°C and freezes at -100°C. Which molecule is the least polar?

molecule A

molecule B

Not enough information is given.

Both are equally polar.

Molecule A and B are the same, but with different properties.

Question 34

Sort the following atoms in order of increasing electronegativity.

Cs, Y, Ga, P, O, F

F, O, Cs, Y, Ga, P

Cs, F, Ga, O, P, Y

Cs, Ga, Y, O, P, F

F, O, Ga, P, Y, Cs

Question 35

How is a molecule different from an ionic compound?

A molecule is a discrete grouping of atoms held together with covalent bonds, whereas an ionic compound is an extended array of repeating ions packed together in a regular lattice.

An ionic compound is a discrete grouping of atoms held together with covalent bonds, whereas a molecule is an extended array of repeating ions packed together in a regular lattice.

An ionic compound is a grouping of ions that are held together by covalent bonds, whereas a molecule is an infinite array of single atoms.

An ionic compound is a grouping of atoms held together by lone pairs of electrons, whereas a covalent compound has bonds that can be depicted as straight lines.