1.

The electronic configuration of the zinc ion, Zn^{2+}, is

Student Response

1. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^7\ 4p^1$.
2. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^2$.
3. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}$.
4. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}$.
5. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$.

2.

How many *lone pairs* of electrons are on each of the fluorine atoms of SF_4?

Student Response

1. 1
2. 2
3. 3
4. 4
5. 0

3.

In the ICl_4^- ion, the electron pairs are arranged around the central iodine atom in the shape of

Student Response

1. an octahedron.
2. a trigonal pyramid.
3. a trigonal bipyramid.
4. a tetrahedron.
5. a square plane.

4.

From a consideration of the Lewis structure of the thiocyanate ion, SCN^-, in which carbon has a double bond with both the sulfur and nitrogen atoms, the formal charges on the sulfur, carbon, and nitrogen atoms are, respectively,

Student Response

1. –2, 0, +1.
2. –2, +1, 0.
3. –1, +1, –1.
4. –1, 0, 0.
5. 0, 0, –1.

5.

The number of valence electrons in the perfluoropropionate ion, $CF_3CF_2COO^-$, is

Student Response

1. 62.
2. 66.
3. 58.
4. 80.
5. 60.

6.

An unpaired electron in a compound is called a(n)

Student Response

1. nothing. It is not possible to have just one unpaired electron in an atom.
2. radical.
3. negative ion.
4. free electron.
5. isotope.

7.

The radii of the species S, S^+, and S^- decrease in the following order:

Student Response

1. $S^+ > S^- > S$.
2. $S > S^+ > S^-$.
3. $S^- > S > S^+$.
4. $S^+ > S > S^-$.
5. $S > S^- > S^+$.

8.

Which of the following has the shortest bond distance?

Student Response

1. C=C
2. C≡C
3. Cl–Cl
4. F–F
5. C–C

9.

Which is true of O^{2-}?

Student Response

1. It is missing only 2 electrons.
2. It is a noble gas.
3. It is an anion.
4. It has three extra electrons.
5. It is a cation.

10.

How many electrons are shown in the Lewis formula for the chlorite ion, ClO_2^-?

Student Response

1. 18
2. 22
3. 20
4. 26
5. 24

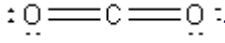
11.

Which of the following species would you expect to have the largest radius?

Student Response

1. Se^{2-}
2. S^{2-}
3. F
4. K^+
5. Ca^{2+}

12.

What is the formal charge on the carbon atom in  ?

Student Response

1. −1
2. 0
3. −2
4. +1
5. +2

13.

In ClF_3, the electron pairs are arranged about the chlorine atom in

Student Response

1. a trigonal pyramid.
2. a trigonal bipyramid.
3. an octahedron.
4. a tetrahedron.
5. a square plane.

14.

How many *lone pairs* of electrons are on each of the oxygen atoms of CO_2?

Student Response

1. 1
2. 2
3. 3
4. 5
5. 0

15.

Consider that each of the following species is in its lowest energy state. Which set contains species that all have the same electronic configuration?

Student Response

1. N^{3-}, O^{2-}, Mg^{2+}, Al^{3+}
2. Mg^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}
3. F^{-}, Cl^{-}, Br^{-}, I^{-}
4. N, O, F, Ne
5. Na^{+}, K^{+}, Rb^{+}, Cs^{+}

16.

How many electrons does a stable phosphide ion have?

Student Response

1. 22
2. 18
3. 13
4. 15
5. 3

17.

What is the electronic configuration of a stable chloride ion?

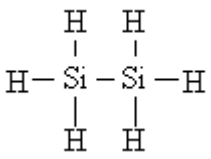
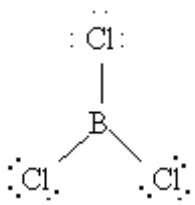
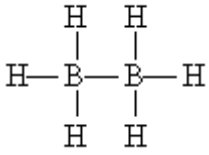
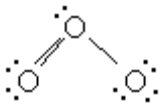
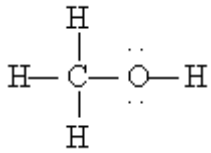
Student Response

1. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$
2. $1s^2\ 2s^2\ 2p^6$
3. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$
4. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$
5. $1s^2\ 2s^2\ 2p^6\ 3s^2$

18.

Which of the following covalent molecules does *not* have the proper Lewis formula?

Student Response

1. 
2. 
3. 
4. 
5. 

19.

Metallic bonds occur when

Student Response

1. bonded atoms both lose electrons.
2. electrons are shared between bonded atoms.
3. there is an electrostatic attraction between ions of opposite charge.
4. metal cations are spaced through a sea of mobile electrons.
5. None of the above

20.

Which species has the largest number of lone pairs of electrons around the central atom?

Student Response

1. $XeOF_4$
2. XeF_4
3. SiF_6^{2-}
4. XeF_6
5. XeF_2