Compounds

Answer Key

1. B

Explanation: In chemical symbols, water is chemically written as H_2O, a binary covalent compound with the chemical name dihydrogen monoxide.

2. A

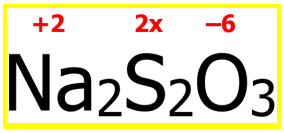
Explanation: Ammonium arsenate is an ionic compound wherein the cation is the ammonium $(NH_4)^+$, and the anion is the arsenate AsO_4^{3-}. Using the criss-cross method, we can obtain the chemical formula $(NH_4)_3AsO_4$.

3. B

Explanation: The scenario described is basically the definition of a coordinate covalent bond, also known as a dative bond.

4. C

Explanation: The chemical formula of sodium thiosulfate is $Na_2S_2O_3$. By virtue of rule 3, the oxidation number of Na is +1, while the oxidation number of O is -2 by virtue of rule 6.



According to rule number 9, the algebraic sum of oxidation numbers in a neutral molecule is zero. Therefore:

$$2x + (+2) + (-6) = 0$$
$$2x = -2 + 6$$

$$2x = +4; x = +2$$

Based on the computation above, the oxidation number of S is +2.

5. A

Explanation: According to rule 6, the oxidation number of oxygen can become -1 in the case of peroxides and superoxides.

6. C

Explanation: There is one atom of C and 2 atoms of O in CO_2. Therefore, its molar mass can be computed as follows:

$$\text{MM } CO_2 = 12 + (2 \times 16) = 44 \text{ g/mol}$$

The percentage carbon in CO_2 can then be computed in this manner.

$$\%\ C\ in\ CO_2 = \frac{12\ g/mol}{44\ g/mol}\ x\ 100 = 27.3\ \%$$

To get the mass of carbon in 50 g of CO_2, we just need to get the 27.3% of 50 g, which is 13.7 g.

7. A

Explanation: Option A has a tetrahedral molecular geometry which is nonpolar while options B and C are both trigonal pyramidal which is a polar molecular geometry.

8. D

Explanation: All substances, regardless of polarity and geometry, exhibit London dispersion forces.

9. B

Explanation: Compound C is expected to have a higher boiling point simply because it is polar and has the N-H bond. Meaning, compound C exhibits LDF, DDF, and hydrogen bonding. In contrast, compound A is a tetrahedral molecule, hence nonpolar and exhibits only LDF.

10. A

Explanation: Recall that in electron pair geometry, the electron pair around the central atom is treated as if it is a substituent atom. Since there is a lone pair electron in the central atom of compound B and C, then the electron pair geometry of all the compounds presented is tetrahedral.