InterActions Unit 6 Chapter 2 Sample Quiz KEY

See the Scientists' Consensus Sheets for assistance.

1. The covalent interaction is

   a. a type of electric-charge interaction between atoms in an element.

   b. a type of electric-charge interaction between atoms in a molecule.

   c. a type of electric charge interaction between atoms in an ion.

   d. a type of electric charge interaction between atoms in a metal.

   Covalent interactions have to do with the interactions holding together the particles in a molecule. To answer this question you need to know the definition of a covalent interaction.

2. The molecule methane is composed of 1 carbon atom and 4 hydrogen atoms. In symbolic form Methane is written as:

   a. $C4H$

   b. $C + H_4$

   c. CH_4

   d. $C + 4H$

   To answer this question you need to know how to write substances in symbolic form.

3. How many bonds are made with the oxygen atoms in the potassium nitrate molecule?

   a. 2

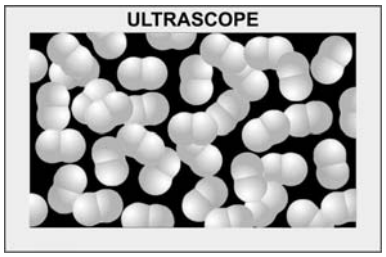
   b. 3

   c. 4

   d. 5

   The three oxygen atoms each bond to the nitrogen atom (that's 3 bonds) and two bond with the potassium atom (that's 2 more bonds) to make a total of 5 bonds. To answer this question you need to know how to count the number of bonds.

A.



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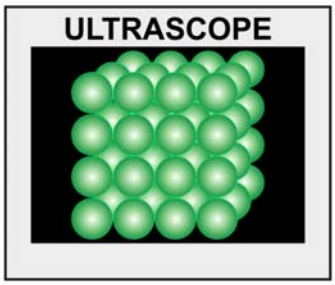

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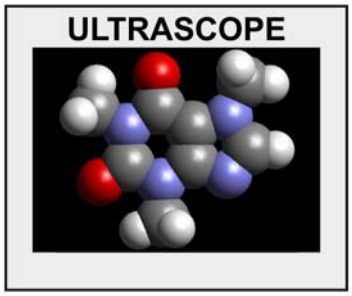

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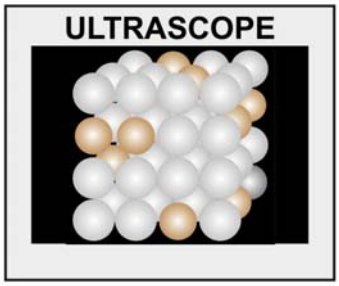

4. Which of the Ultrascope images above represents molecules with covalent bonds?

   a. A and B

   b. C & D

   c. A & C

   d. A, B, & C

A covalent bond is between atoms in a molecule. Images C and D do not represent molecules. To answer this question you need to know what a covalent bond is, what a molecule is, and what a molecule looks like.

5. When methane is burned it interacts with oxygen to form carbon dioxide and water vapor. What are the reactant(s) and product(s) of this interaction?

    a. **reactants**: methane and carbon dioxide; **products**: water and oxygen.

    b. **reactants**: dioxide and carbon; **products**: methane, oxygen and water.

    c. **reactants**: oxygen and carbon dioxide; **products**: methane and water

    d. **reactants**: methane and oxygen; **products**: carbon dioxide and water.

    The reactants are the original substances and the products are the new substances formed after a chemical interaction. To answer this question you need to know what reactants and products are.

6. During a chemical interaction

    a. two molecules collide and form a new atom.

    b. two molecules collide and the atoms recombine to form one or more new molecules.

    c. two molecules combine during a cohesive interaction and the atoms recombine to form one or more new molecules.

    d. two molecules combine during a cohesive interaction and the atoms recombine to form a new atom.

    Chemical interactions occur when reactants collide and atoms rearrange to form new products. To answer this question you need to know what happens to particles during a chemical interaction.

Images for questions 6-7

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 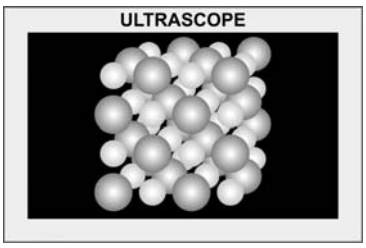 </td>
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 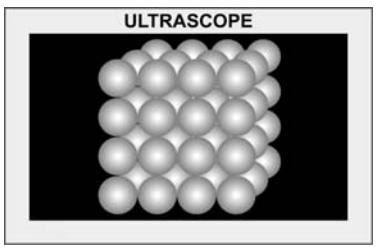 </td>
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 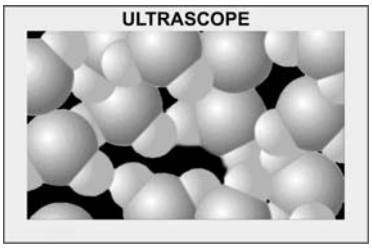 </td>
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 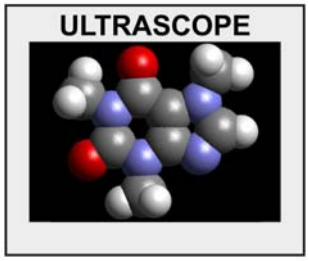 </td>
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7. Which of the above images shows an ionic bond?

a. A

b. B

c. C

d. D

Ionic bonds are charged atoms (ions) in an array. To answer this question you need to know what an ionic bond is and how it looks in the Ultrascope.

8. Which of the above images shows a metallic bond?

a. A

b. B

c. C

d. D

Metallic bonds are the attractions between neighboring metal atoms. To answer this question you need to how a metallic bond looks in the Ultrascope.

9. The stored chemical bond energy is

a. the sum of all the energies including stored volume energy, stored phase energy, and, stored cohesion energy.

b. the sum of energies stored in all the bonds including those in the nucleus.

c. the sum of energies stored in all the cohesive bonds between molecules.

d. the sum of energies stored in all the chemical bonds between neighboring atoms/ions.

There are three types of chemical bonds: metallic, ionic, and covalent. The stored chemical energy is the sum of all the energy stored in all the bonds. To answer this question you need to know what stored chemical energy is.

10. . Which sentence best describes a balanced chemical equation?

a. The number of atoms of each element is the same in both the reactants and products.

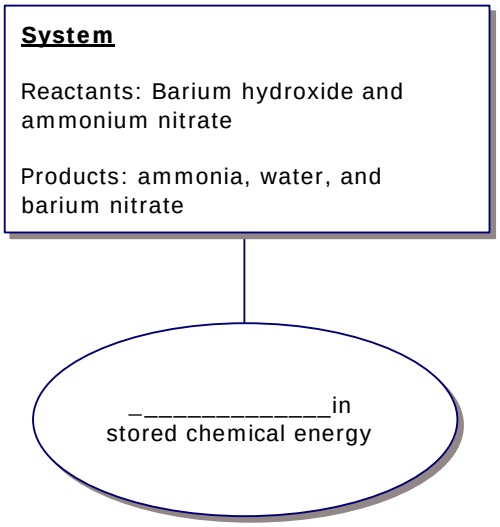
b. The total number of molecules is the same in both the reactants and products.

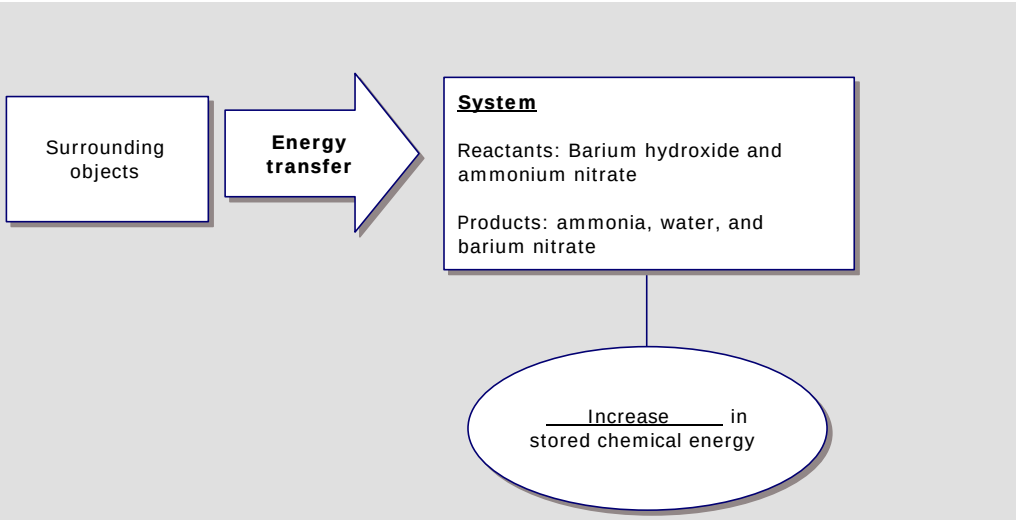
c. The mass of each atom is the same before and after the chemical reaction.

d. The mass of all the atoms in the reactants is the same, and the mass of all the atoms in the products is the same.

In a balanced chemical equation atoms are not created or destroyed, only rearranged. To answer this question you need to know what a balanced chemical equation represents.

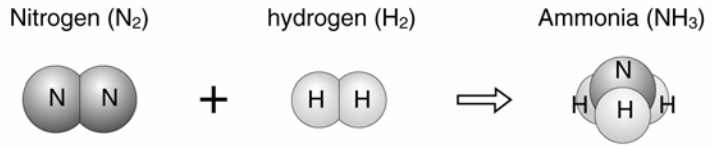
11. Below is an incomplete energy diagram for the reaction between barium hydroxide and ammonium nitrate to produce ammonia, water, and barium nitrate. When these two substances are mixed together in a flask, the flask feels cool. Draw and label the energy transfer arrow (energy input or energy output and the type of energy transfer). Fill in the blank of the energy oval.





During an endothermic reaction energy is absorbed because the stored chemical energy of the product is greater than that of the reactant. To answer this question you need to know what an endothermic reaction is and how to draw an energy diagram describing it.

12. Nitrogen (N_2) and hydrogen (H_2) combine to produce silver chloride and Ammonia (NH_3). An unbalanced picture equation for this chemical reaction is show below. Balance the picture equation by drawing in any necessary atoms or molecules. .

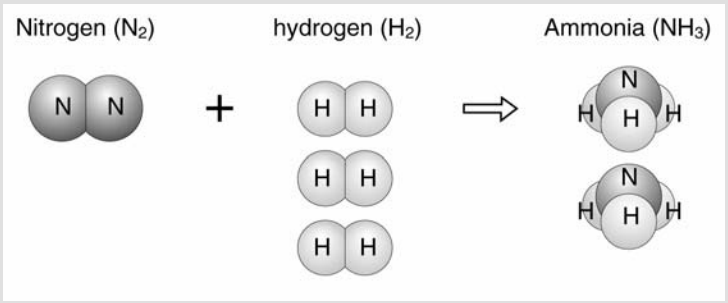


Check that the equation is balanced by completing the table:

	REACTANTS	**PRODUCTS**
Keeping Track of the Atoms	**Number of _____ atoms:** . **Number of _____ atoms:** . **Number of _____ atoms:** . **TOTAL:**	**Number of _____ atoms:** . **Number of _____ atoms:** . **Number of _____ atoms:** . **TOTAL:**

Write the balanced symbolic equation below.

Answer:



To balance the picture equation you need to make sure that the same number of nitrogen (N) atoms and hydrogen (H) atoms are on each side of the equation. Since

there are three hydrogen and one nitrogen atom to each ammonia molecule, you can balance this equation by having one N_2 molecule react with 3 H_2 molecules resulting in 2 ammonia molecules. To answer this question you need to know that the total number of each type of atom, and the total number of atoms is conserved during a chemical reaction.

Check that the equation is balanced by completing the table:

	REACTANTS	PRODUCTS
Keeping Track of the Atoms	**Number of N atoms: 2** **Number of H atoms: 6** **Number of _____ atoms:** **TOTAL: 8**	**Number of N atoms: 2** **Number of H atoms: 6** **Number of _____ atoms:** **TOTAL: 8**

The total number of Nitrogen (N) atoms and Hydrogen (H) atoms is the same for the reactants and the products, and the total number of atoms is the same. To answer this you need to know how to count up the atoms and that the total number of atoms is conserved in a chemical reaction.

Write the balanced symbolic equation below.

$$N_2 + 3H_2 \rightarrow 2NH_3$$

To answer this question you need to know how to write the symbolic form of a chemical equation.

13. A carbon atom

a. cannot bond with many types of atoms.

b. can bond in many ways with other carbon atoms and other elements.

c. can bond in many ways but are not commonly found in nature.

d. bond only with other carbon atoms.

Carbon atoms are prevalent in our lives. They are in our clothing, food, machines, and in our cells. Carbon atoms are present in more than 13 million known compounds. To answer this test question you need to know that carbon can form many different compounds because it can have make one to four covalent bonds.

14. Which item below does not describe a synthetic polymer?

a. made in the laboratory.

b. come from coal or oil.

c. consist of proteins.

d. used to make shampoo bottles and grocery bags.

Proteins are a natural polymer. To answer this question you need to know about synthetic and natural polymers.

15. The human body is composed primarily of

a. fat.

b. salt.

c. carbohydrates.

d. water.

About 70% of the human body is water. To answer this question you need to know the importance water plays in life.

16. Which of the following is NOT true about fats? Fats are:

a. polymers.

b. an efficient way to store energy.

c. a poor insulator

d. do not dissolve in water

Fats are a very good insulator, which is why animals that live in cold climates have thick layers of fat to keep from freezing. To answer this question you need to know about fats.

17. The main function of proteins is

a. an energy source for life.

b. chemically reacting with enzymes .

c. dissolving other chemicals necessary for life.

d. making enzymes that control chemical reactions.

Proteins can be used as an energy source but only during conditions of starvation. The main role of proteins is in body building and creating enzymes. To answer this question you need to know about the function of proteins.

18. Which statement is NOT TRUE about DNA molecules. DNA molecules

a. are polymers.

b. are in the nucleus of every cell.

c. have chemical regulators to turn on only the needed genes.

d. exist in each cell (except blood cells) and each cell contains an identical set of DNA.

Chemical regulators within the cell turn on and off the necessary genes to create the needed protein. These regulators are not contained within the DNA. To answer this question you need to know about DNA.