

3 | Chapter Test A**Key Concepts**

Choose the letter of the best answer. (4 points each)

- _____ 1. The color change that occurs when iron rusts is evidence of a(n)
a. physical change
b. increase in concentration
c. temperature change
d. chemical reaction
- _____ 2. The reaction in which methane is burned, $\text{CH}_4 + 2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{CO}_2$, is an example of a
a. decomposition reaction
b. combustion reaction
c. precipitate reaction
d. synthesis reaction
- _____ 3. A reaction that combines simpler reactants to form a new compound is called a
a. combustion reaction
b. decomposition reaction
c. concentration reaction
d. synthesis reaction
- _____ 4. Which statement reflects the law of conservation of mass?
a. Mass can be created but not destroyed.
b. Mass can be destroyed but not created.
c. Mass cannot be created or destroyed.
d. Mass can be created and destroyed.
- _____ 5. In the chemical equation $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$, 2H_2
a. is a reactant
b. is a product
c. indicates a combustion reaction
d. indicates the direction of the reaction

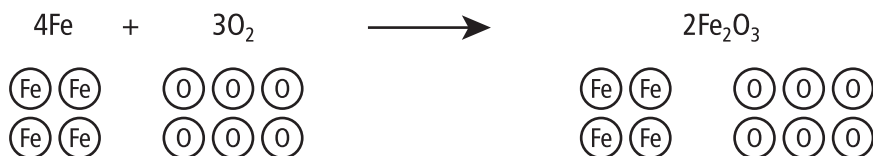
- _____ 6. In the equation $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$, the coefficient of the hydrogen reactant is
- 1
 - 2
 - 3
 - 6
- _____ 7. The energy needed to break reactants apart or combine them into new products is known as
- bond energy
 - exothermic energy
 - heat energy
 - endothermic energy
- _____ 8. An exothermic reaction is typically marked by a(n)
- decrease in concentration
 - increase in temperature
 - increase in elements
 - decrease in catalysts
- _____ 9. Most living things obtain energy through a process that is very similar to a combustion reaction. This process is called
- catalytic conversion
 - silicon purification
 - respiration
 - photosynthesis
- _____ 10. Silicon can be chemically refined and then used to make
- microchips
 - enzymes
 - endotherms
 - photosynthesizers

Analyzing Data

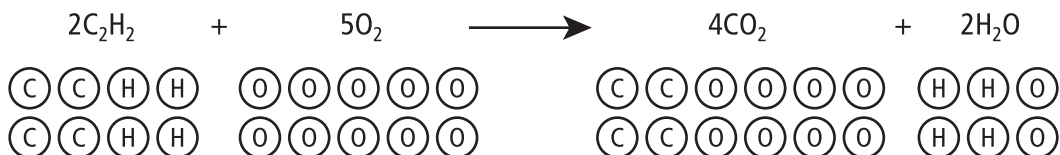
Using the equations, answer the following questions. (6 points each)

Chemical Equations

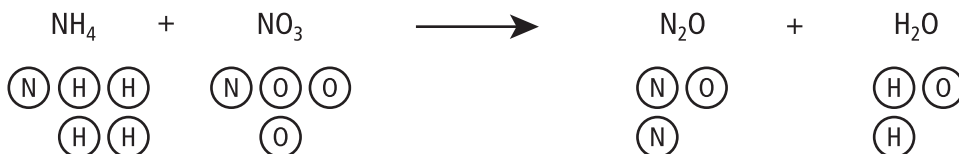
Equation 1



Equation 2



Equation 3



11. Which equation represents a combustion reaction?

12. In the reactants for equation 1, what is the subscript for oxygen?

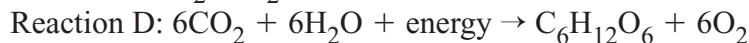
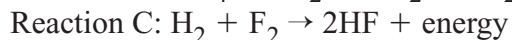
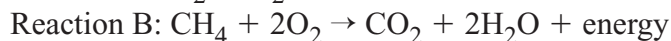
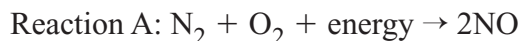
13. Write the formula for each reactant in equation 3.

14. Which equation is not balanced?

15. How could you balance this equation?

Interpreting Visuals

Using the equations, answer the following questions. (6 points each)



16. Is reaction C endothermic or exothermic?

17. Which reaction(s) require(s) more energy to break bonds in the reactants than is released by the formation of bonds in the products?

18. Which reaction(s) would you expect to release light or heat?

Extended Response

Answer the following questions on the back of this paper or on a separate sheet of paper. (6 points each)

19. **Describing** Look at the list of terms below. Choose three of the terms. Describe how they affect the rate at which a chemical reaction takes place.

concentration

surface area

temperature

catalysts

20. **Explaining** Many chemical reactions appear to use up mass. For example, in a wood fire, the ash left over is less massive than the wood that burned. Lavoisier experimented with mercury in a jar to investigate the mass involved in chemical reactions. Describe his experiment. Explain how it led him to the idea of conservation of mass.