

Name \_\_\_\_\_

## STUDY GUIDE

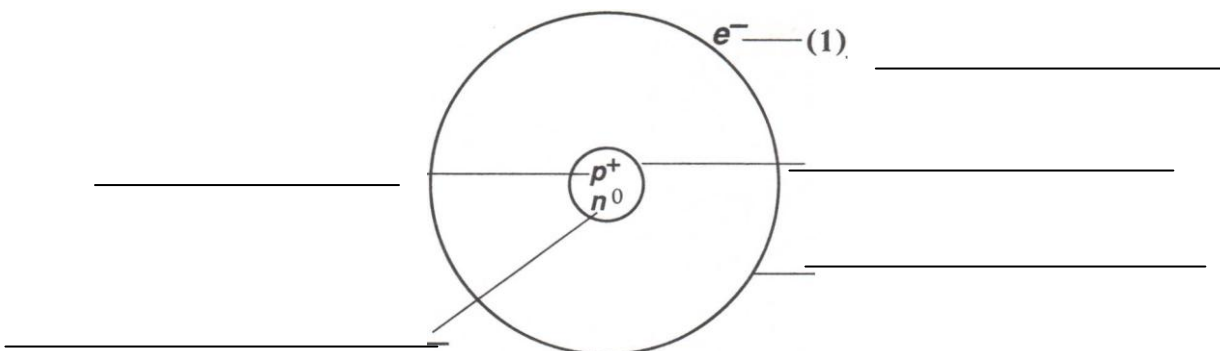
# MATTER AND ENERGY

### Section 3.1 Matter and Its Combinations

*In your textbook, read about atoms, elements, molecules, compounds, ions, and symbols and formulas.*

Label the parts of the atom. Use these choices:

**energy level      electron      neutron      proton      nucleus**



**Complete the chart by writing the correct items for each substance.**

Substance	Element, Compound, or Ion	Symbol or Formula	Number of Molecules	Number of Atoms
5. 5HCl	compound		5	
7. 14Fe		symbol		14
8. C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>		formula	1	
9. Na <sup>+</sup>				1
10. 8C	element			
11. 6H <sub>2</sub> O				
12. 3CO <sub>2</sub>				

*In your textbook, read about properties of matter and chemical change.*

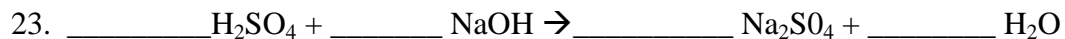
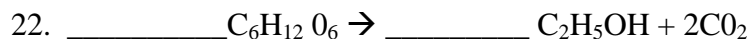
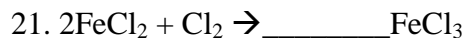
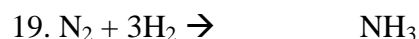
**Complete the chart by checking the correct column for each process.**

Process	Change in Physical Property	Change in Chemical Property
13. digesting food		
14. freezing water		
15. rusting iron		
16. melting wax		
17. dissolving sugar		
18. chewing food		

### Section 3.1 Matter and Its Combinations continued Section 3.1

*In your textbook, read about chemical equations and solutions.*

Balance each chemical equation using the simplest whole numbers. You may choose to leave some blanks empty.



*Determine if the statement is true. If it is not, rewrite the italicized term to make it true.*

24. NaCl has a(n) *covalent* bond. \_\_\_\_\_

25.  $\text{H}_2\text{O}$  is made up of *molecules*. \_\_\_\_\_

26. HCl has a(n) *ionic* bond. \_\_\_\_\_

27.  $\text{Na}^+$  is a(n) *molecule*. \_\_\_\_\_

28. Salt water is a(n) *compound*. \_\_\_\_\_

29. Water will dissolve *sugar*. \_\_\_\_\_

#### *Acids and Bases.*

Use the pH scale below to help you identify each material and its pH.

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
	Tile cleaner			Coffee			$\text{H}_2\text{O}$			Detergent				Lye

30. \_\_\_\_\_ is a strong base with a pH of \_\_\_\_\_.

31. \_\_\_\_\_ is a weak acid with a pH of \_\_\_\_\_.

32. \_\_\_\_\_ is neutral and has a pH of \_\_\_\_\_.

33. \_\_\_\_\_ is a strong acid with a pH of \_\_\_\_\_.

34. \_\_\_\_\_ is a weak base with a pH of \_\_\_\_\_.

## Biological Chemistry Section 3.2

In your textbook, read about carbon compounds, carbohydrates, lipids, proteins, and nucleic acids.

**Examine each group of terms. Cross out the one term that does not belong with the others. Then write a name for the group. Use these choices:**

**proteins      lipids      nucleic acids      carbohydrates**

1. \_\_\_\_\_

**DNA  
RNA  
genetic code  
ribonucleic acid  
energy sources**

2. \_\_\_\_\_

**galactose  
amino acids  
carboxyl group  
NH<sub>2</sub>  
polypeptides**

3. \_\_\_\_\_

**C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>  
monosaccharides  
glycerol  
maltose  
glycogen**

4. \_\_\_\_\_

**energy reserves  
fatty acids  
C<sub>12</sub>H<sub>22</sub>O<sub>11</sub>  
glycerol  
waxes**

*Determine if the statement is true. If it is not, rewrite the italicized part to make it true.*

5. All organic compounds are compounds that contain *oxygen*. \_\_\_\_\_

6. *Isomers* are organic molecules that have the same chemical formula, but different structural formulas. \_\_\_\_\_

7. *Proteins* are composed of fatty acids and glycerol. \_\_\_\_\_

8. Carbohydrates usually contain hydrogen and oxygen in a ratio of 4:1. \_\_\_\_\_

9. Maltose and sucrose are two examples of *monosaccharides*. \_\_\_\_\_

10. Cellulose, glycogen, and starch are *simple* carbohydrates. \_\_\_\_\_

11. *Lipids* include fats, oils, and waxes. \_\_\_\_\_

12. The cell's activities are controlled by *carbohydrates*. \_\_\_\_\_

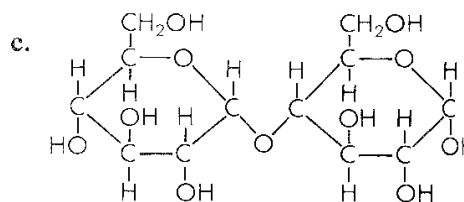
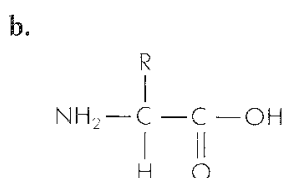
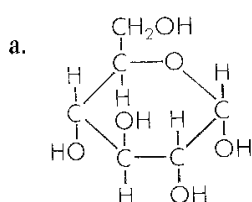
13. Lipids are *insoluble* in water. \_\_\_\_\_

14. *Proteins* are composed of 20 different amino acids. \_\_\_\_\_

# MATTER AND ENERGY

## Biological Chemistry continued

15. Identify the structural formula. Use these choices: *amino acid* *maltose* *glucose*



For each statement write the letter of one of the structural formulas in Exercise 15. A letter may be used more than once.

\_\_\_\_\_ 16. When many are bonded together a protein is formed.

\_\_\_\_\_ 17. It is a disaccharide with the formula  $C_{12}H_{22}O_{11}$ .

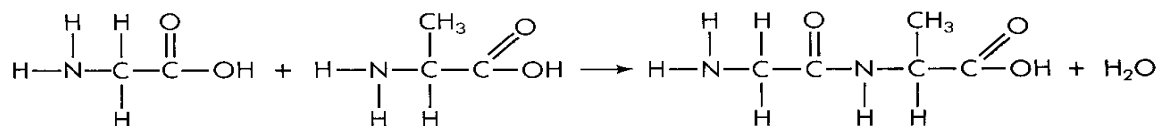
\_\_\_\_\_ 18. It is an isomer of fructose and galactose.

\_\_\_\_\_ 19. There are twenty different types of these.

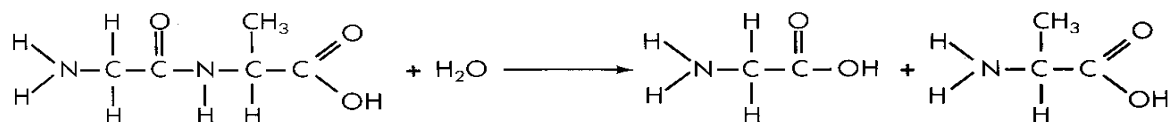
\_\_\_\_\_ 20. This is a monosaccharide, or simple sugar.

Examine the chemical reactions below. Then identify them by placing the letter of the correct reaction, A or B, in front of each phrase below.

**A**



**B**



\_\_\_\_\_ 21. Hydrolysis

\_\_\_\_\_ 22. condensation

\_\_\_\_\_ 23. large molecule is broken down into smaller molecules

\_\_\_\_\_ 24. involved in the digestion of food

\_\_\_\_\_ 25. involves removal of water

\_\_\_\_\_ 26. involves addition of water

## Energy and Reactions

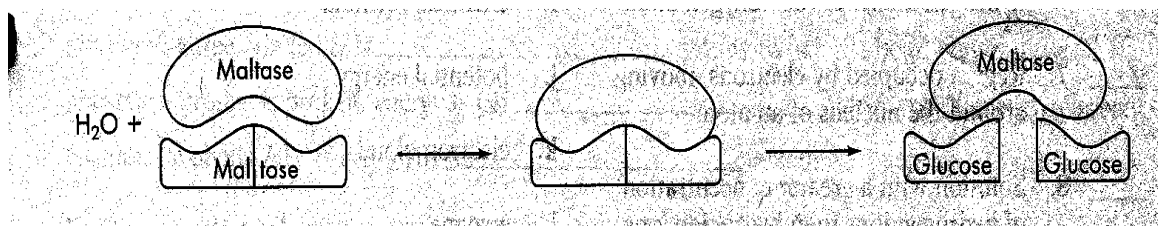
*In your textbook, read about transformation of energy and activation energy.*

**Complete the chart by checking the correct column for each example.**

Example	Potential Energy	Kinetic Energy	Activation Energy
1. Girl playing basketball			
2. Match being used to light a candle			
3. Glucose molecule			
4. Windmill blades turning			
5. Waterfall			
6. Heart beating			
7. Sled positioned at top of hill			

*In your textbook, read about enzymes, a model of enzyme function, and coenzymes.*

**Examine this model of an enzyme reaction. Then answer the questions that follow.**



8. What is the name of the enzyme shown in the model?
9. What is the name of the substrate shown?
10. Does the reaction represent condensation or hydrolysis? Explain.
11. How are enzymes named?
12. To what class of biological compounds do enzymes belong?
13. Explain how enzymes affect activation energy and reaction temperature.
14. How does the modern induced fit model of enzyme-substrate interaction differ from the original lock-and-key hypothesis?

## Vocabulary

Match the definition in Column A with the correct term in Column B.

Column A

- \_\_\_\_\_ 1. Compound that is the building block of a protein molecule
- \_\_\_\_\_ 2. Energy of position, or stored energy
- \_\_\_\_\_ 3. Protein that lowers the energy needed to start a reaction
- \_\_\_\_\_ 4. Solution with a greater concentration of hydroxide ions than hydrogen ions
- \_\_\_\_\_ 5. Type of bond formed when atoms combine by sharing electrons
- \_\_\_\_\_ 6. Organic compound composed of hydrogen and oxygen with a ratio of two hydrogen atoms to each oxygen atom
- \_\_\_\_\_ 7. Region occupied by electrons moving around the nucleus of an atom
- \_\_\_\_\_ 8. Solution with a greater concentration of hydrogen ions than hydroxide ions
- \_\_\_\_\_ 9. Substance composed of only one type of atom
- \_\_\_\_\_ 10. Energy of motion
- \_\_\_\_\_ 11. Minimum amount of energy needed to start a chemical reaction
- \_\_\_\_\_ 12. Substance composed of two or more atoms of different elements joined by a chemical bond
- \_\_\_\_\_ 13. Non-protein molecule that helps enzymes in reactions
- \_\_\_\_\_ 14. Group of symbols showing the number and kind of each atom in a compound

Column B

- a. acid
- b. covalent
- c. kinetic energy
- d. compound
- e. base
- f. element
- g. amino acid
- h. coenzyme
- i. chemical formula
- j. potential energy
- k. electron cloud
- l. enzyme
- m. carbohydrate
- n. activation energy