1. The factor being tested in an experiment is the  

2. A possible explanation for an event that occurs in nature is called a(n)  
A. prediction.  B. hypothesis.  C. observation.  D. analysis of data.

3. Using the information below, what is the correct order for the steps of scientific inquiry?  
   1. Theory  2. Conclusion  3. Hypothesis  4. Experimentation  
   A. 1, 3, 2, 4  B. 3, 4, 1, 2  C. 3, 4, 2, 1  D. 4, 1, 2, 3

4. Which of the following is the correct order for the scientific method?  
   1. State a theory.  2. Collect data.  3. Formulate a hypothesis.  4. Experiment.  
   A. 1, 3, 4, 2  B. 1, 4, 2, 3  C. 3, 1, 2, 4  D. 3, 4, 2, 1

5. The part of an experiment that is subjected to all of the procedures except the one being tested is called the  

6. An explanation for observed phenomena that is supported by many experiments is called  
A. a theory.  B. a control.  C. homeostasis.  D. an hypothesis.

7. A group of people was used to test the effectiveness of a new toothpaste compared to their regular toothpaste. Which of the following procedures represents a controlled test?  
   A. Have everyone in the group brush with the new toothpaste.  
   B. Have everyone brush with both their regular toothpaste and the new toothpaste.  
   C. Have half the group brush with the new toothpaste and the other half not brush their teeth.  
   D. Have half the group brush with the new toothpaste and the other half with their regular toothpaste.

8. The growth rate in most plants increases when water supply is plentiful. A possible explanation would be that water is a reactant in photosynthesis. This explanation is an example of  
A. a theory.  B. a hypothesis.  C. a conclusion.  D. an observation.

9. The maintenance of the body's constant internal environment is termed  

10. A role of water in cells of the human body is to  

11. A water molecule joins with an adjacent water molecule by forming a(n)  

12. Which of the following is necessary for hydrogen bonding?  

13. The polarity of a water molecule results from  
   A. more of the protons being in the hydrogen nucleus.  
   B. more of the electrons being near the hydrogen nucleus.  
   C. the equal numbers of protons in hydrogen and oxygen.  
   D. the unequal sharing of electrons between hydrogen and oxygen.

14. Water molecules are connected to each other by  

15. Water allows chemical reactions in cells to occur because it  
   A. acts as a solvent.  B. evaporates readily.  C. is less dense as a solid.  D. promotes dehydration synthesis.

16. If the pH of a solution changes from 2 to 5, then the solution has  
   A. become a base.  B. lost hydrogen ions.  C. become more acidic.  D. gained hydrogen ions.

17. A substance that prevents large changes in the pH of a solution is  
18. Substances that increase the concentration of hydrogen ions in a solution are  

19. Blood has a pH that is slightly basic. A sample of blood containing a buffer is treated with a weak acid. Which pH value would result?  
   A. 1.57  B. 6.78  C. 7.38  D. 13.21

20. The pH of blood is slightly basic. Which of the following would be the pH of blood?  
   A. 2.0  B. 6.8  C. 7.4  D. 10.3

21. Acids are defined as compounds that dissociate in water to release  
   A. chloride ions Cl\(^-\)  B. calcium ions Ca\(^{2+}\)  C. hydrogen ions H\(^+\)  D. hydroxide ions OH\(^-\)

22. Which of the following differences between acids and bases is correct?  
   A. Acids are harmful, bases are not.  
   B. Acids lower the pH, bases raise the pH.  
   C. Acids release amino groups, bases release glycerol.  
   D. Acids release hydroxide ions, bases release hydrogen ions.

23. Organisms maintain pH at a constant level through the use of  

24. The process that joins amino acids together to make enzymes is  

25. Which of the following is a unit molecule of hydrolysis?  
   A. ADP when it is being converted into ATP.  
   B. Cellulose when it is being converted into glucose.  
   C. Fatty acids when they are being converted into lipid.  
   D. Amino acids when they are being converted into protein.

26. Which of the following is an amino (amine) group?  
   A. NH\(_2\)  B. OH\(^-\)  C. PO\(_4\)\(^{3-}\)  D. COOH

27. The level of protein structure represented by the alpha-helix shape is  

28. The linear sequence of amino acids found in an enzyme is called its  

29. Proteins may denature when  
   A. pH is changed.  B. oxygen is present.  C. they form enzymes.  D. substrate concentration is increased.

30. When a protein loses its normal three-dimensional configuration, it is said to be  

31. Which of the following is a function of some proteins?  
   A. Emulsify fats.  B. Make up genes.  C. Make up cell walls.  D. Speed up chemical reactions.

32. A glucose molecule contains  
   A. six carbon atoms.  
   B. two high-energy phosphates.  
   C. three fatty acids and glycerol.  
   D. a long chain of carbohydrate rings.

33. The building blocks or monomers that make up carbohydrates are  

34. Which of the following molecules is a carbohydrate?  
   A. C\(_3\)H\(_7\)O\(_2\)N  B. C\(_6\)H\(_{12}\)O\(_6\)  C. C\(_{12}\)H\(_{22}\)O\(_2\)  D. C\(_{20}\)H\(_{40}\)O\(_2\)

35. Carbohydrates are composed of  
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>36. The unit molecule of a protein is</td>
<td>D. an amino acid.</td>
</tr>
<tr>
<td>37. Glucose in cells is used <strong>primarily</strong></td>
<td>A. as an energy source.</td>
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<tr>
<td>38. The breakdown of a disaccharide may produce</td>
<td>B. glycerol.</td>
</tr>
<tr>
<td>39. The bending and folding of a protein molecule would produce a</td>
<td>C. a fatty acid.</td>
</tr>
<tr>
<td>40. Which of the following is made up of a long chain of glucose molecules?</td>
<td>B. Starch.</td>
</tr>
<tr>
<td>41. The bonding of a glucose molecule and a maltose molecule would result in a</td>
<td>B. starch.</td>
</tr>
<tr>
<td>42. The hydrolysis of which of the following substances will produce the greatest number of glucose molecules?</td>
<td>A. Maltose.</td>
</tr>
<tr>
<td>43. The major component of a plant cell wall is a product formed from the dehydration synthesis of</td>
<td>A. fatty acids.</td>
</tr>
<tr>
<td>44. The main difference between cellulose and starch molecules is</td>
<td>A. the type of linkage between glucose subunits.</td>
</tr>
<tr>
<td>45. How many double bonds are there between carbon atoms in a saturated fatty acid?</td>
<td>A. 0</td>
</tr>
<tr>
<td>46. A characteristic of unsaturated fats is that they</td>
<td>B. are made up of glucose and fructose.</td>
</tr>
<tr>
<td>47. Which of the following are components of a phospholipid?</td>
<td>A. cholesterol, glycerol, fatty acids</td>
</tr>
<tr>
<td>48. Compared to saturated fats, unsaturated fats contain less</td>
<td>A. oxygen.</td>
</tr>
<tr>
<td>49. A lipid molecule is produced when</td>
<td>A. fatty acids bond to glycerol.</td>
</tr>
<tr>
<td>50. Lipids are composed of</td>
<td>A. nucleotides.</td>
</tr>
</tbody>
</table>
51. The carbon chain of a saturated fatty acid
   A. has no double bonds.
   B. is the basis of the ATP molecule.
   C. forms hydrogen bonds with itself.
   D. has a repeating backbone of sugars and phosphates.

52. An unsaturated fat could be changed into a saturated fat if
   A. peptide bonds were broken.
   B. hydrogen atoms were added.
   C. glycerol molecules were added.
   D. fatty acid chains were shortened.

53. Fatty acids containing double bonds are found in

54. Which of the following types of bonding occurs during complementary base pairing?
   A. ionic  B. peptide  C. covalent D. hydrogen

55. Nucleic acids are composed of
   A. glucose  B. enzymes  C. fatty acids D. nucleotides.

56. Energy released from the breakdown of monosaccharides in the cytoplasm is stored in
   A. ATP.  B. RNA.  C. DNA.  D. ADH.

57. Which of the following is not a part of a nucleotide?

58. Which of the following is composed of nucleotides?

59. In the human body, steroid molecules can act as

60. Which of the following represents the structure of a nucleotide?
   A. Salt – lipid – base.
   B. Glucose – glucose – glucose.
   C. Phosphate – sugar – nitrogenous base.
   D. Amino acid – amino acid – amino acid.

61. Which of the following disrupts homeostasis?

62. Which of the following is an example of negative feedback?
   A. Flipping a switch turns on a light.
   B. Turning on the lights increases the rate of plant growth.
   C. Turning up a dial on the oven increases the temperature.
   D. The thermostat shuts off the furnace as the room temperature reaches 20 ° C.

63. A substance which helps maintain a constant pH in a solution is a(n)

64. The maintenance of a constant pH of the blood is achieved by

65. A substance that combines with excess hydrogen or hydroxide ions in a solution is called

66. The chemical reactions in the small intestine take place in a basic (alkaline) environment. Which number indicates this basic pH?
   A. 2.5  B. 4.6  C. 6.9  D. 8.5
67. Some biologically-important molecules dissolve easily in water because the water molecule is

68. Which of the following describes hydrolysis?
   A. Taking up excess hydroxide ions.
   B. Making a polymer by removing water.
   C. Making water by combining an acid and a base.
   D. Adding water to break a polymer into unit molecules.

69. Which substance is produced in **every** dehydration synthesis reaction?

70. Synthesis of protein involves the bonding of amino acids to

71. Which of the following is an example of denaturation?
   A. Water freezing.
   B. Sugar dissolving in water.
   C. Egg white forming a solid when heated.
   D. Butter changing from a solid to a liquid.

72. A radioactive element is sometimes used to trace the pathway of chemical reactions in the cell. If newly
    synthesized proteins are radioactive, the radioactive element used could be

73. 1. Catalysts.  2. Building blocks of DNA.  3. Structural components of cell membrane.  4. Main source of
    energy in cellular respiration.  Proteins act as

74. What is the ratio of hydrogen to oxygen molecules in a carbohydrate?
   A. 1:1    B. 1:2    C. 2:1   D. 3:1

75. The bonding of unit molecules to produce a polysaccharide is called

76. Which of the following is made up of glucose molecules?

77. An increase in thyroxin will have which of the following effects?
   A. increased CO₂ production
   B. increased glycogen production
   C. decreased rate of ATP production
   D. decreased rate of glucose metabolism

78. Which of the following is a polymer?

79. Increased levels of thyroxin in the blood result in decreased levels of TSH. This is an example of
   A. diffusion.  B. active transport.  C. positive feedback.  D. negative feedback