

Place answers in the blank in front of the question number. When finished, transfer your answers to the answer sheet. Next week place your exam in the big box and your answer sheet in the smaller box and pick up an In-class portion of Exam #1.

\_\_\_1. What is the total number of atoms present in a molecule of water?

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

\_\_\_2. How many different elements are in a glucose molecule,  $C_6H_{12}O_6$ ?

- a. 3
- b. 6
- c. 18
- d. 24
- e. 30

\_\_\_3. A covalent bond could be reasonably described as "a love hate relationship" where the repulsion of the positive charged protons is balanced by the attraction of protons for shared electrons, resulting in stored energy.

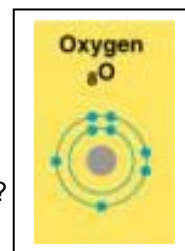
- a. T
- b. F

\_\_\_4. How many electrons does oxygen (O) need to obtain in order to fill its valence shell?

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

\_\_\_5. How many covalent bonds will an oxygen atom form with hydrogen atoms?

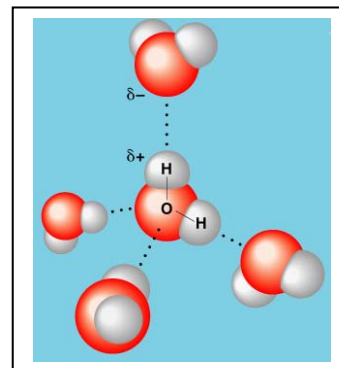
- a. 1
- b. 2
- c. 3
- d. 4
- e. 5



\_\_\_6. Hydrogen bonds can affect the secondary structure of a protein, but not the primary structure.

- a. true
- b. false

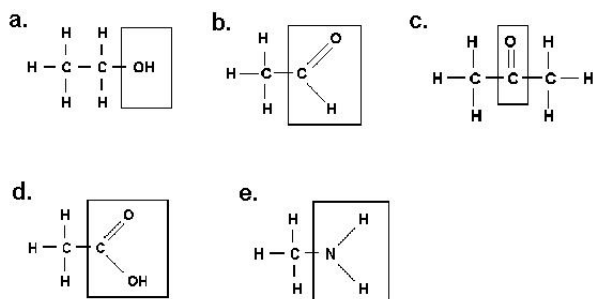
- \_\_\_7. Which bonds must be broken for water to vaporize?
- ionic bonds
  - nonpolar covalent bonds
  - polar covalent bonds
  - hydrogen bonds
  - Both polar covalent bonds and hydrogen bonds are correct.



- \_\_\_8. Water changes temperature very quickly compared to most other things, such as metal or rock.
- true
  - false
- \_\_\_9. Morphine has its effect because it has a portion that fits the endorphin receptor.
- true
  - false
- \_\_\_10. The pH scale uses numbers above 7 to indicate acidic solutions.
- true
  - false
- \_\_\_11. Molecules that are insoluble in water are made up largely of non-polar covalent bonds.
- true
  - false

Match the letter of the functional group below that best matches with the term.

- \_\_\_12. Which is most likely an amino functional group?
- \_\_\_13. Which is most likely to dissociate, contributing a hydrogen ion to the solution and causing it to increase in acidity?
- \_\_\_14. Which is most likely an hydroxyl group giving the molecule the properties of an alcohol?
- \_\_\_15. Which is most likely a carbonyl functional group as an aldehyde giving the molecule the properties of a sugar?
- \_\_\_16. Which is most likely a carbonyl functional group as a ketone giving the molecule the properties of a ketose sugar?



- \_\_\_17. The chemical reactions illustrated in Figure 5.3 below demonstrate hydrolysis.  
 a. true  
 b. false
- \_\_\_18. The chemical reactions in Figure 5.3 below are dehydration synthesis reactions.  
 a. true  
 b. false

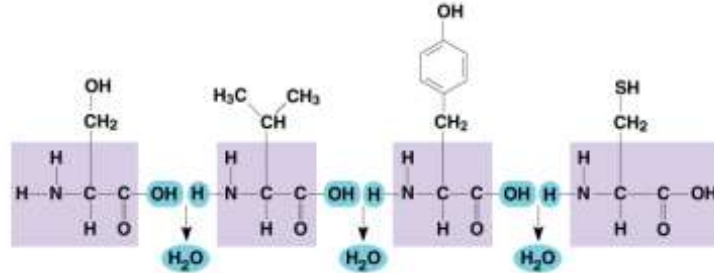
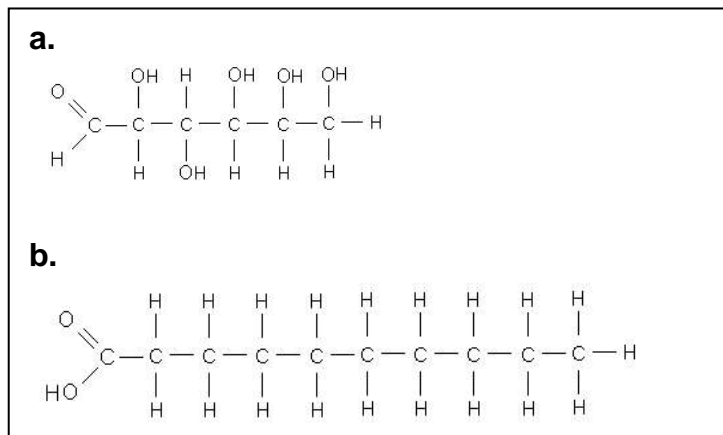


Figure 5.3

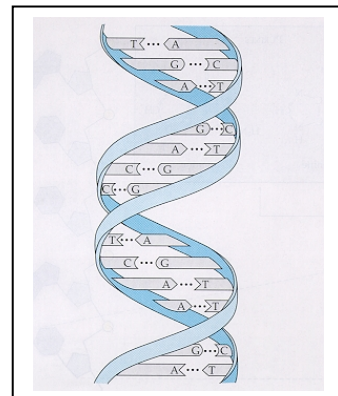
- \_\_\_19. Fats have almost twice the calories per ounce compared to sugar and other carbohydrates? Based on this information, which covalent bond most likely contains the most chemical energy? You may wish to inspect the two molecules in the box below.

- a. C-H  
 b. C-OH  
 c. C=O  
 d. C-C  
 e. H-H



- \_\_\_20. Which molecule above is best described as carbohydrate?
- \_\_\_21. Which statement includes correctly related terms?  
 a. sugar monomers, proteins, nucleotide polymers, glycosidic linkages  
 b. amino acid monomers, peptides, hydrolysis, ester linkages  
 c. sugar monomers, polysaccharides, carbohydrates, glycosidic linkages  
 d. amino acid monomers, nucleic acids, polypeptides, ester linkages  
 e. nucleotide monomers, polysaccharides, polypeptides and peptide linkages

- \_\_\_22. The molecule in the box at right is best described as  
 a. carbohydrate  
 b. lipid  
 c. protein  
 d. nucleic acid



\_\_\_23. Repeatedly washing a lab table with antibiotic soap can over time cause the growth of a population of antibiotic resistant bacteria over many generations of cell division. The process that causes small genetic change in a population over time is

- a. microevolution
- b. feed back regulation
- c. emergent properties
- d. hierarchy of life

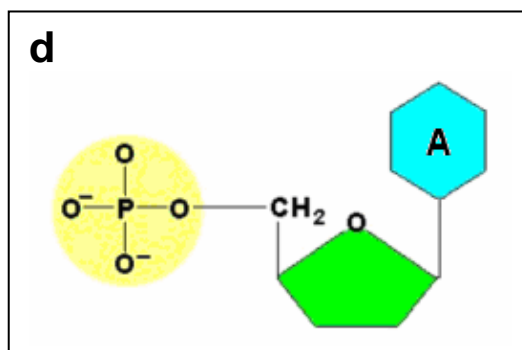
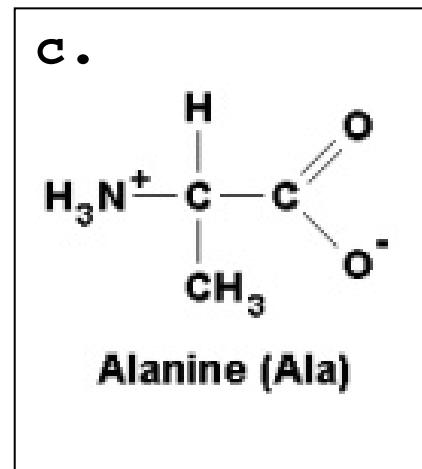
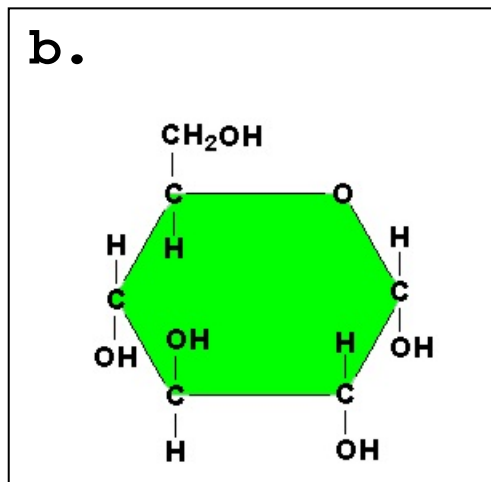
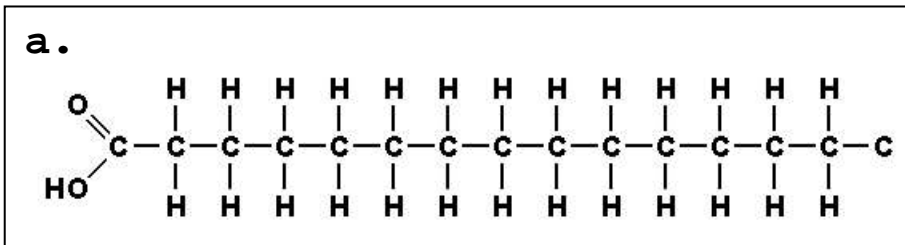
Match the molecules below with the most appropriate term.

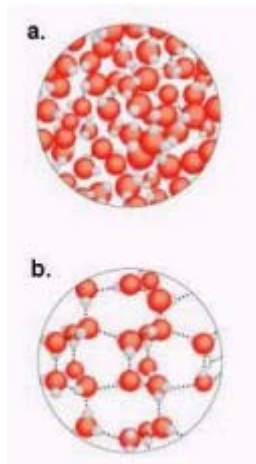
\_\_\_24. A nucleotide monomer

\_\_\_25. A carbohydrate monomer (sugar) shown in the *ring form*

\_\_\_26. An amino acid

\_\_\_27. A fatty acid.

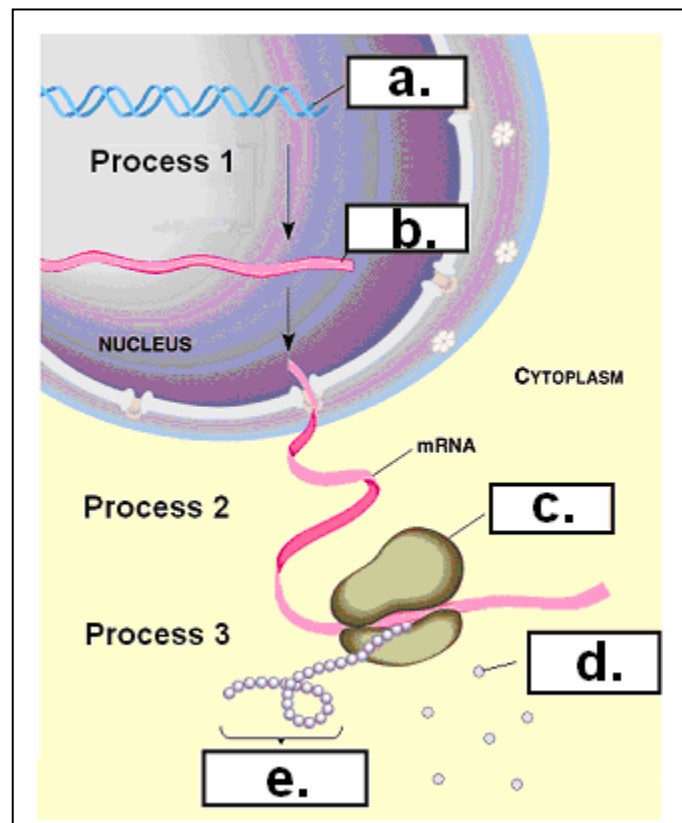




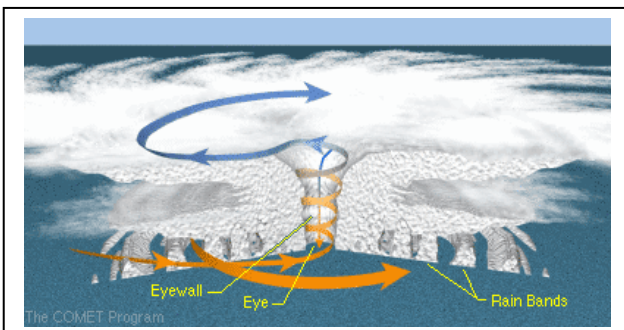
- \_\_\_ 28. Which of the above most likely represents ice?
- \_\_\_ 29. The "random motion of molecules" best describes
- kinetic energy
  - nuclear energy
  - electromagnetic radiation energy
  - chemical energy
- \_\_\_ 30. Monomers are bonded together to form polymers by
- dehydration (aka condensation) synthesis
  - digestion
  - hydrolysis
  - nuclear fusion
  - ionic bonding
- \_\_\_ 31. Which monomers are associated with carbohydrate polymers?
- sugars
  - amino acids
  - nucleotides (A,T,C,G)
  - fatty acids and glycerol

Match the following molecules with the most appropriate label in the figure right.

- \_\_\_ 32. mRNA
- \_\_\_ 33. ribosome
- \_\_\_ 34. amino acids
- \_\_\_ 35. most likely a hemoglobin molecule
- \_\_\_ 36. organelle carrying out condensation synthesis using amino acids as monomers



- \_\_\_37. Carbon-14, containing 2 more neutrons than the more common carbon-12, is called
- an ion.
  - an isotope`.
  - a polar atom.
  - an isomer.
  - radioactive.
- \_\_\_38. What do atoms form when they share electron pairs?
- ionic bonds
  - ions
  - molecules containing covalent bonds
  - isotopes
  - hydrogen bonds
- \_\_\_39. Results from an unequal sharing of electrons between atoms, such as when oxygen is covalently bonded to hydrogen.
- nonpolar covalent molecule
  - polar covalent bond
  - ionic bond
  - hydrogen bond
  - hydrophobic interaction
- \_\_\_40. Best explains attraction of water molecules to each other.
- nonpolar covalent molecule
  - polar covalent bond
  - ionic bond
  - hydrogen bond
  - hydrophobic interaction
- \_\_\_41. When water molecules evaporate from a stream or lake, they cool the water left behind because
- hydrogen bonds have been broken
  - covalent bonds have been formed
  - the water molecules have dissociated into H<sup>+</sup> and OH<sup>-</sup>
  - the evaporated molecules take kinetic energy with them when they leave
  - hydrogen bonds are both broken and reformed in a dynamic equilibrium
- \_\_\_42. When water molecules rise, cool and condense, they give off heat to the surrounding atmosphere causing an updraft that pulls more warm moist air up from below. This occurs because
- the spinning of the earth causes a Coriolis effect heating the air causing it to fall
  - breaking covalent bonds liberates energy as heat
  - clouds reflect radar and have an infrared or "heat signature" seen through Doppler Radar
  - the formation of hydrogen bonds during condensation gives off heat that rises.
  - the formation of polar covalent bonds liberates kinetic energy



- \_\_\_43. What gas do plants give off during active photosynthesis?
- CO<sub>2</sub> carbon dioxide
  - H<sub>2</sub>O liquid water
  - CH<sub>4</sub> methane
  - O<sub>2</sub> oxygen
  - C<sub>3</sub>H<sub>8</sub> propane

Use the choices below to answer the following questions 44 & 45. Each choice may be used once, more than once, or not at all.

- nonpolar covalent molecule
- polar covalent bond
- ionic bond
- hydrogen bond
- hydrophobic interaction

\_\_\_44. Results from an unequal sharing of electrons between atoms, such as when oxygen is covalently bonded to hydrogen.

- 
- 
- 
- 
- 

\_\_\_45. Best explains attraction of water molecules to each other.

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- 
- 
- 
- 

\_\_\_46. One difference between carbon-12 and carbon-14 is that carbon-14 has

- 2 more protons than carbon 12.
- 2 more electrons than carbon 12.
- 2 more neutrons than carbon 12.

Use the following for 47-50

- dehydration synthesis
- hydrolysis

\_\_\_47. forms covalent bonds

\_\_\_48. breaks covalent bonds

\_\_\_49. forms polymers from monomers

\_\_\_50. most like the action of insulin

END