

Multiple choice: Circle the best answer for each of the following questions.

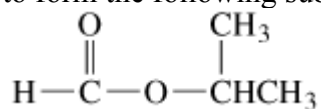
1. The general formula for a carboxylic acid is:

- a) RCHO      b) RCOR'      c) R-OH      d) R-COOH

2. In which of the following would octanoic acid be the most soluble?

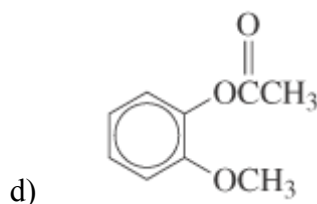
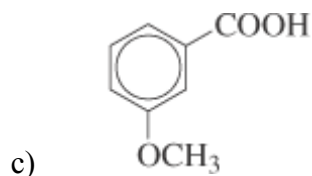
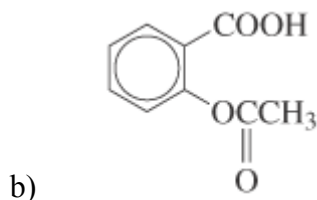
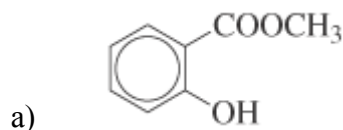
- a) pure water      b) 1.0 M HCl      c) 1.0 M NaCl      d) 1.0 M NaOH

3. The compounds necessary to form the following substance in the presence of acid are:

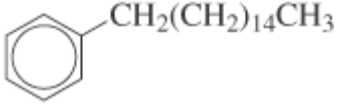


- a) CH<sub>3</sub>OH and CH<sub>3</sub>CH<sub>2</sub>COOH      b) HCOOH and CH<sub>3</sub>CH<sub>2</sub>OH  
c) HCOOH and CH<sub>3</sub>CH(OH)CH<sub>3</sub>      d) CHOOCH(OH)CH<sub>3</sub> and CH<sub>3</sub>OH

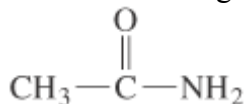
4. The formula for aspirin is:



5. Which of the following is the formula for a soap?

- a) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>COONa  
b) CH<sub>3</sub>(CH<sub>2</sub>)<sub>14</sub>COONa  
c) CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COOH  
d) 

6. The common name for the following compound is:



- a) ammonium acetate      b) aminoethanol      c) acetamide      d) methanamide

7. In which of the following will heptanamine be the most soluble?

- a) 1.0 M NaOH      b) pure water      c) 1.0 M HCl      d) 1.0 M NaCl

8. All of the following are classified as alkaloids *except*:

- a) nicotine      b) cocaine      c) morphine      d) urea

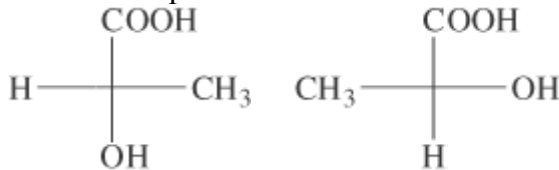
9. Which criteria is used to classify amines as primary, secondary, or tertiary?

- a) the number of carbon atoms attached to the nitrogen  
b) the number of hydrogen atoms attached to the nitrogen  
c) the total number of nitrogen atoms present in a molecule  
d) the type of carbon attached to the nitrogen

10. Most amines have a pleasant odor.

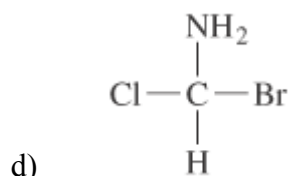
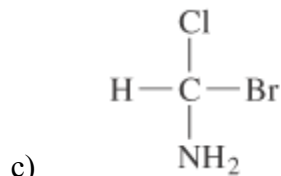
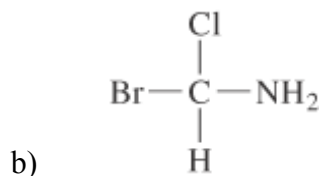
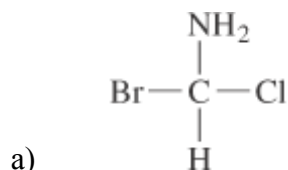
- a) True      b) False

11. The following two structures represent:

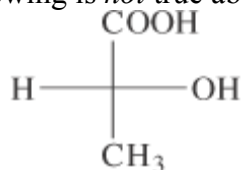


- a) a pair of enantiomers  
b) diastereomers  
c) cis-trans isomers  
d) the same compound

12. Three of the following projection formulas are the same compound. The other is the enantiomer. Which is the enantiomer?



13. Which of the following is *not* true about the formula below?



- a) The OH group is projected away from the observer.
- b) The chiral carbon is in the plane of the paper.
- c) The model represents an optically active substance
- d) The model is called a projection formula.

14. Which object below is achiral?

- a) glove
- b) shoe
- c) scissors
- d) sphere

15. A compound with two chiral carbons can exist as two pairs of enantiomers and have four pairs of diastereomers.

- a) True                      b) False

16. Which of the following is *not* true of fructose?

- a) It is an aldohexose.  
b) It is a component of sucrose.  
c) It is the sweetest common sugar.  
d) It is a hexose.

17. Which of the following is *not* true of glucose?

- a) It is also known as dextrose.  
b) It is a component of starch and cellulose  
c) It is a disaccharide.  
d) It is a component of pure cane sugar from Hawaii

18. D-ribose and L-ribose are examples of:

- a) structural isomers              b) enantiomers              c) diastereomers              d) epimers

19. Which of the following will give a negative result in the Benedict's test?

- a) beta-D-glucopyranose  
b) sucrose  
c) maltose  
d) alpha-D-glucopyranose

20. Which of the following is *not* true about lactose?

- a) It is hydrolyzed by lactase.  
b) It is metabolized by bacteria that live in the large intestines.  
c) It is produced in mammary glands.  
d) It contains galactose and fructose.

21. What is the defining characteristic of a lipid?

- a) All lipids are soluble in non-polar organic solvents.  
b) All lipids have structures based on a system of four fused carbon rings.  
c) All lipids have sulfur atoms in their structure.  
d) All lipids are esters.

22. Which of the following statements *must* be true of a polyunsaturated fatty acid?

- a) It has 20 carbon atoms.
- b) It has a trans double bond.
- c) It has more than one double bond.
- d) It has no double bonds.

23. Fats and oils are compounds containing the \_\_\_\_\_ (i) \_\_\_\_\_ functional group prepared by the condensation of fatty acid molecules with \_\_\_\_\_ (ii) \_\_\_\_\_.

- |    | i         | ii            |
|----|-----------|---------------|
| a) | amide     | amino acids   |
| b) | ester     | glycerol      |
| c) | anhydride | each other    |
| d) | ester     | carbohydrates |

24. The generally accepted model for biological membranes is the:

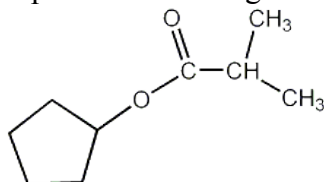
- a) lipid bilayer model
- b) fluid transport model
- c) solid-liquid model
- d) fluid-mosaic model

25. What form of membrane transport requires no energy expenditure by the cell and uses proteins to bind a target molecule on the side of the membrane with a higher concentration of the target molecule then release the molecule on the other side of the membrane (where the concentration is low)?

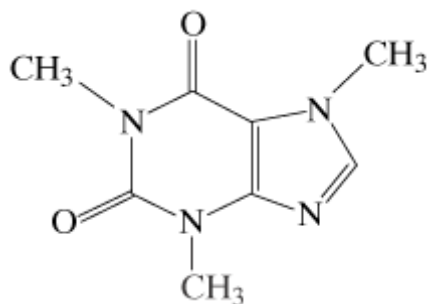
- a) active transport.
- b) reverse transport.
- c) facilitated diffusion.
- d) simple diffusion.

Short Answers: Show your work in the space provided.

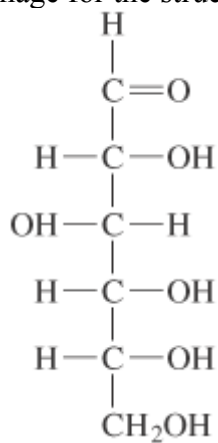
26. Draw and name the products resulting from the acid hydrolysis of the following molecule:



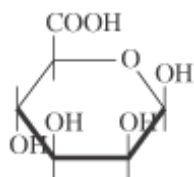
27. Identify with arrows all the amide functional groups in the following molecule.



28. Draw the mirror image for the structure below:



29. Identify the chiral centers, using arrows, in the molecule below:



30. Draw the cis and trans isomers for the following fatty acid.  
 $\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{COOH}$