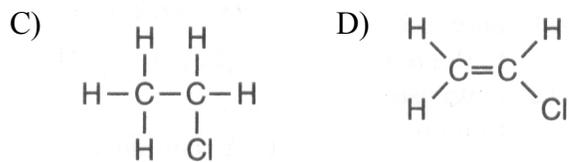
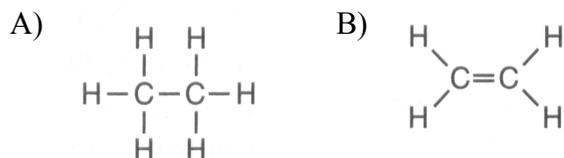


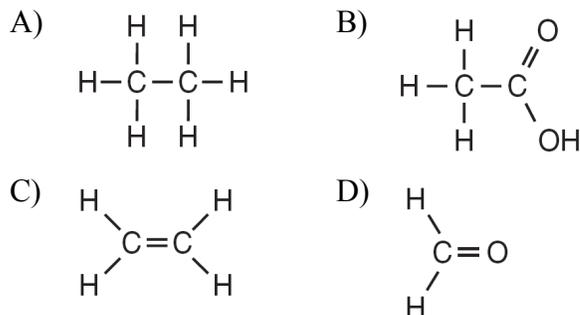
1. Which formula represents an unsaturated hydrocarbon?



2. Which hydrocarbon is saturated?

- A) propene                      B) ethyne  
C) butene                        D) heptane

3. Which structural formula represents an unsaturated hydrocarbon?



4. Which formula represents an unsaturated hydrocarbon?

- A)  $\text{CH}_2\text{CHCl}$                       B)  $\text{CH}_3\text{CH}_2\text{Cl}$   
C)  $\text{CH}_3\text{CH}_2\text{CH}_3$                     D)  $\text{CH}_3\text{CHCH}_2$

5. Given the structural formula:



What is the total number of electrons shared in the bond between the two carbon atoms?

- A) 6            B) 2            C) 3            D) 4

6. Which general formula represents the homologous series of hydrocarbons that includes the compound 1-heptyne?

- A)  $\text{C}_n\text{H}_{2n-6}$                       B)  $\text{C}_n\text{H}_{2n-2}$   
C)  $\text{C}_n\text{H}_{2n}$                          D)  $\text{C}_n\text{H}_{2n+2}$

7. The compounds 2-butanol and 2-butene both contain

- A) double bonds, only    B) single bonds, only  
C) carbon atoms            D) oxygen atoms

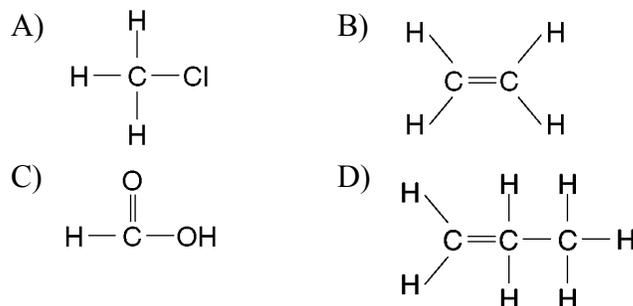
8. Given the structural formulas for two organic compounds:



The differences in their physical and chemical properties are primarily due to their different

- A) number of carbon atoms  
B) number of hydrogen atoms  
C) molecular masses  
D) functional groups

9. Which structural formula is *incorrect*?



10. A characteristic of most organic compounds is that they

- A) have low melting points  
B) have high melting points  
C) are soluble in water  
D) conduct electricity when dissolved in water

11. Which of the following compounds has the highest normal boiling point?

- A)  $\text{C}_2\text{H}_6$     B)  $\text{C}_3\text{H}_8$     C)  $\text{C}_4\text{H}_{10}$     D)  $\text{C}_5\text{H}_{12}$

12. A student investigated four different substances in the solid phase. The table below is a record of the characteristics (marked with an *X*) exhibited by each substance.

Characteristic Tested	Substance A	Substance B	Substance C	Substance D
High Melting Point	<i>X</i>		<i>X</i>	
Low Melting Point		<i>X</i>		<i>X</i>
Soluble in Water	<i>X</i>			<i>X</i>
Insoluble in Water		<i>X</i>	<i>X</i>	
Decomposed under High Heat	<i>X</i>			
Stable under High Heat	<i>X</i>		<i>X</i>	<i>X</i>
Electrolyte	<i>X</i>			<i>X</i>
Nonelectrolyte		<i>X</i>	<i>X</i>	

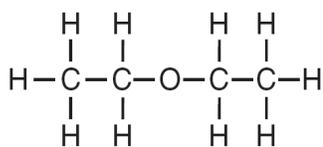
Which substance has characteristics most like those of an organic compound?

- A) *A*                      B) *B*                      C) *C*                      D) *D*

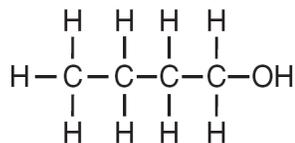
13. Which statement explains why the element carbon forms so many compounds?

- A) Carbon atoms combine readily with oxygen.  
 B) Carbon atoms have very high electronegativity.  
 C) Carbon readily forms ionic bonds with other carbon atoms.  
 D) Carbon readily forms covalent bonds with other carbon atoms.

14. Given the formulas for two compounds:



and



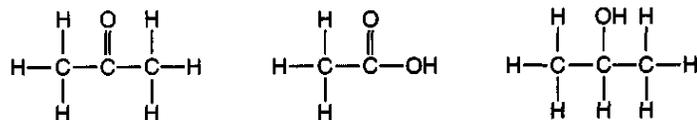
These compounds differ in

- A) gram-formula mass  
 B) molecular formula  
 C) percent composition by mass  
 D) physical properties at STP

15. Which two compounds are isomers of each other?

- A)  $\text{CH}_3\text{CH}_2\text{COOH}$  and  $\text{CH}_3\text{COOCH}_2\text{CH}_3$   
 B)  $\text{CH}_3\text{CH}_2\text{CHO}$  and  $\text{CH}_3\text{COCH}_3$   
 C)  $\text{CH}_3\text{CHBrCH}_3$  and  $\text{CH}_2\text{BrCHBrCH}_3$   
 D)  $\text{CH}_3\text{CHOHCH}_3$  and  $\text{CH}_3\text{CHOHCH}_2\text{OH}$

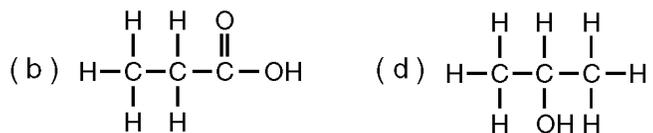
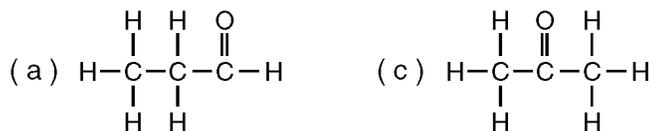
16. Given the three organic structural formulas shown below:



Which organic compound classes are represented by these structural formulas, as shown from left to right?

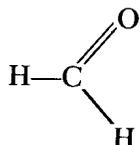
- A) ester, organic acid, ketone  
 B) ester, aldehyde, organic acid  
 C) ketone, aldehyde, alcohol  
 D) ketone, organic acid, alcohol

17. Given the formulas of four organic compounds:



Which pair below contains an alcohol and an acid?

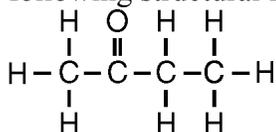
- A) *a* and *b*                      B) *a* and *c*  
 C) *b* and *d*                      D) *c* and *d*



18. Which is represented by the structural formula above?

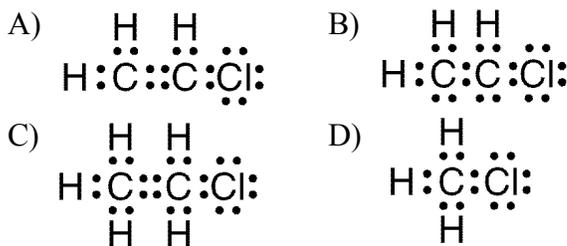
- A) an aldehyde                  B) an alcohol  
 C) an alkane                      D) an acid

19. What is the IUPAC name of the compound with the following structural formula?

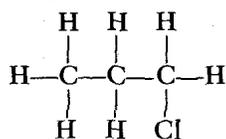


- A) propanone                      B) propanal  
 C) butanone                      D) butanal

20. Which Lewis electron-dot diagram represents chloroethene?



21. What is the correct IUPAC name of the following compound?

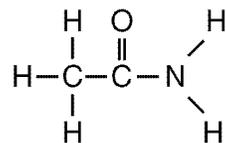


- A) ethane                              B) propane  
 C) 3-chloropropane              D) 1-chloropropane

22. The compound  $\text{CH}_3\text{CH}_2\text{COOCH}_3$  is an example of

- A) an ester                          B) an alcohol  
 C) an acid                              D) a polymer

23. Given the structural formula:



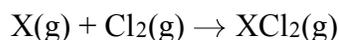
This compound is classified as an

- A) amide                              B) amine  
 C) aldehyde                          D) alcohol

24. Which formula represents an ether?

- A)  $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_3$       B)  $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$   
 C)  $\text{CH}_3-\text{O}-\text{CH}_3$                   D)  $\text{CH}_3-\text{OH}$

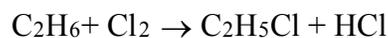
25. Given the incomplete equation representing an organic addition reaction:



Which compound could be represented by X?

- A)  $\text{CH}_4$     B)  $\text{C}_2\text{H}_4$     C)  $\text{C}_3\text{H}_8$     D)  $\text{C}_4\text{H}_{10}$

26. Given the equation:



This reaction is best described as

- A) addition involving a saturated hydrocarbon  
 B) addition involving an unsaturated hydrocarbon  
 C) substitution involving a saturated hydrocarbon  
 D) substitution involving an unsaturated hydrocarbon

27. Molecules of propene combine in a chemical reaction to produce a large single molecule. This reaction is called

- A) substitution                      B) fermentation  
 C) polymerization                  D) esterification

28. Which equation represents an esterification reaction?

- A)  $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 2 \text{C}_2\text{H}_5\text{OH} + 2 \text{CO}_2$   
 B)  $\text{C}_5\text{H}_{10} + \text{H}_2 \rightarrow \text{C}_5\text{H}_{12}$   
 C)  $\text{C}_3\text{H}_8 + \text{Cl}_2 \rightarrow \text{C}_3\text{H}_7\text{Cl} + \text{HCl}$   
 D)  $\text{HCOOH} + \text{CH}_3\text{OH} \rightarrow \text{HCOOCH}_3 + \text{HOH}$

29. Which reaction produces ethyl alcohol as one of the principal products?

- A) an esterification reaction
- B) a neutralization reaction
- C) a saponification reaction
- D) a fermentation reaction

30. Which products are obtained when  $\text{CH}_4(\text{g})$  burns completely in an excess of oxygen?

- A)  $\text{CO}$  and  $\text{H}_2\text{O}$
- B)  $\text{CO}$  and  $\text{C}$
- C)  $\text{CO}_2$  and  $\text{H}_2\text{O}$
- D)  $\text{CO}_2$  and  $\text{CO}$

31. Which is a product of the hydrolysis of an animal fat by a strong base?

- A) water
- B) gasoline
- C) soap
- D) toluene

32. Which compound has an isomer?

