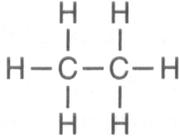
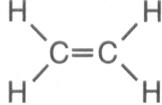
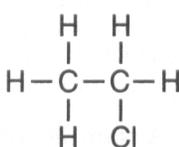
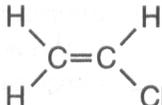
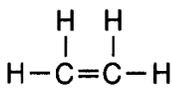
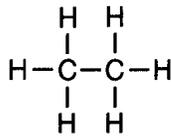
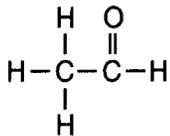
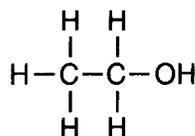
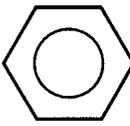


1. A molecule of a compound contains a total of 10 hydrogen atoms and has the general formula C_nH_{2n+2} . Which prefix is used in the name of this compound?
 A) **but-** B) dec- C) oct- D) pent-
2. Which compound is a saturated hydrocarbon?
 A) CH_2CH_2 B) **CH_3CH_3**
 C) CH_3CHO D) CH_3CH_2OH
3. Which formula represents an unsaturated hydrocarbon?
 A)  B) 
 C)  D) 
4. In which group could the hydrocarbons all belong to the same alkene series?
 A) C_2H_2 , C_2H_4 , C_2H_6
 B) C_2H_2 , C_2H_4 , C_4H_8
 C) C_2H_4 , C_2H_6 , C_3H_6
 D) **C_2H_4 , C_3H_6 , C_4H_8**
5. Which formula represents an unsaturated hydrocarbon?
 A)  B) 
 C)  D) 
6. A straight-chain hydrocarbon that has only one double bond in each molecule has the general formula
 A) C_nH_{2n-6} B) C_nH_{2n-2}
 C) **C_nH_{2n}** D) C_nH_{2n+2}
7. A molecule of butane and a molecule of 2-butene both have the same total number of
 A) **carbon atoms** B) hydrogen atoms
 C) single bonds D) double bonds
8. A carbon-carbon triple bond is found in a molecule of
 A) butane B) butanone
 C) butene D) **butyne**
9. Given the structural formula:
 $H-C \equiv C-H$
 What is the total number of electrons shared in the bond between the two carbon atoms?
 A) **6** B) 2 C) 3 D) 4
10. Which molecular formula can be represented by the structural formula shown below?

 A) **C_6H_6** B) C_6H_{10}
 C) C_6H_{12} D) C_6H_{14}
11. Which compound represents a member of the benzene series?
 A) acetylene B) ethylene
 C) **toluene** D) propene
12. Cracking hydrocarbon molecules will result in
 A) larger molecules with lower boiling points
 B) larger molecules with higher boiling points
 C) **smaller molecules with lower boiling points**
 D) smaller molecules with higher boiling points
13. Petroleum is a complex mixture of
 A) hydroxides B) **hydrocarbons**
 C) esters D) ethers
14. A common gaseous fuel that is often found with petroleum is
 A) carbon monoxide B) carbon dioxide
 C) **methane** D) ethene
15. Which atoms can bond with each other to form chains, rings, or networks?
 A) **carbon atoms** B) hydrogen atoms
 C) oxygen atoms D) nitrogen atoms

Review Organic Reactions

16. Butanal and butanone have different chemical and physical properties primarily because of differences in their

- A) **functional groups**
- B) molecular masses
- C) molecular formulas
- D) number of carbon atoms per molecule

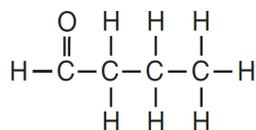
17. Which two compounds have the same molecular formula but different chemical and physical properties?

- A) $\text{CH}_3\text{CH}_2\text{Cl}$ and $\text{CH}_3\text{CH}_2\text{Br}$
- B) CH_3CHCH_2 and $\text{CH}_3\text{CH}_2\text{CH}_3$
- C) CH_3CHO and CH_3COCH_3
- D) **$\text{CH}_3\text{CH}_2\text{OH}$ and CH_3OCH_3**

18. Which structural formula is *incorrect*?

- A)
$$\begin{array}{c} \text{H} \\ | \\ \text{H}-\text{C}-\text{Cl} \\ | \\ \text{H} \end{array}$$
- B)
$$\begin{array}{c} \text{H} \quad \quad \text{H} \\ \diagdown \quad \diagup \\ \text{C}=\text{C} \\ \diagup \quad \diagdown \\ \text{H} \quad \quad \text{H} \end{array}$$
- C)
$$\begin{array}{c} \text{O} \\ || \\ \text{H}-\text{C}-\text{OH} \end{array}$$
- D)
$$\begin{array}{c} \text{H} \quad \quad \text{H} \quad \quad \text{H} \\ \diagdown \quad | \quad | \\ \text{C}=\text{C}-\text{C}-\text{H} \\ \diagup \quad | \quad | \\ \text{H} \quad \quad \text{H} \quad \quad \text{H} \end{array}$$

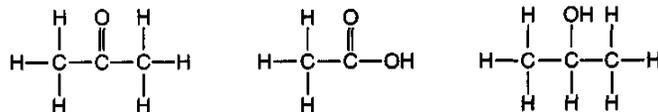
19. Given a formula representing a compound:



Which formula represents an isomer of this compound?

- A)
$$\begin{array}{cccc} & \text{H} & \text{H} & \text{H} & \text{O} \\ & | & | & | & || \\ \text{H}- & \text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\ & | & | & | & \\ & \text{H} & \text{H} & \text{H} & \end{array}$$
- B)
$$\begin{array}{cccc} & \text{H} & \text{O} & \text{H} & \text{H} \\ & | & || & | & | \\ \text{H}- & \text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\ & | & & | & | \\ & \text{H} & & \text{H} & \text{H} \end{array}$$
- C)
$$\begin{array}{cccc} & \text{H} & \text{H} & \text{H} & \text{O} \\ & | & | & | & || \\ \text{H}- & \text{C} & -\text{C} & -\text{C} & -\text{C}-\text{OH} \\ & | & | & | & \\ & \text{H} & \text{H} & \text{H} & \end{array}$$
- D)
$$\begin{array}{cccc} & \text{H} & \text{H} & \text{O} & \quad \text{H} \\ & | & | & || & | \\ \text{H}- & \text{C} & -\text{C} & -\text{C} & -\text{O}-\text{C}-\text{H} \\ & | & | & & | \\ & \text{H} & \text{H} & & \text{H} \end{array}$$

20. Given the three organic structural formulas shown below:

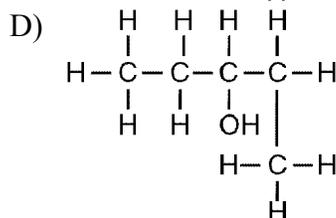
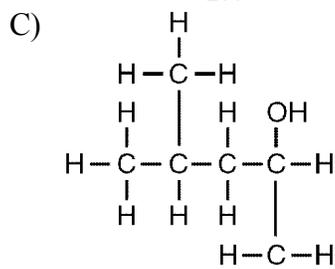
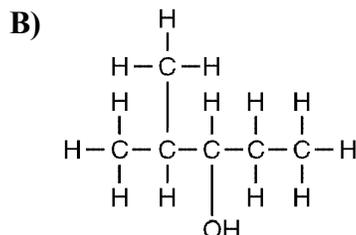
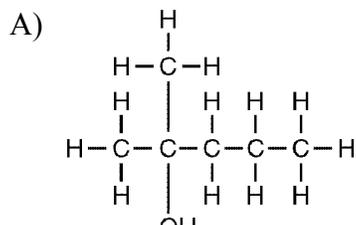


Which organic compound classes are represented by these structural formulas, as shown from left to right?

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

Review Organic Reactions

21. Which structural formula is correct for 2-methyl-3-pentanol?



22. The organic compound represented by the condensed structural formula $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$ is classified as an

- A) alcohol **B) aldehyde**
 C) ester D) ether

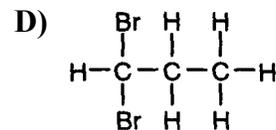
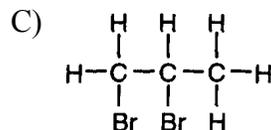
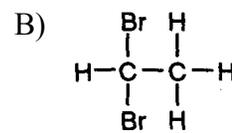
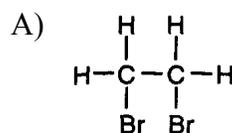
23. Which formula represents a ketone?

- A) HCOOH B) HCHO
C) CH_3COCH_3 D) $\text{CH}_3\text{CH}_2\text{OH}$

24. What is the minimum number of carbon atoms a ketone may contain?

- A) 1 B) 2 **C) 3** D) 4

25. Which structural formula represents 1,1-dibromopropane?



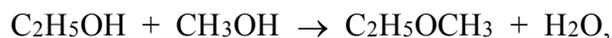
26. The reaction between an organic acid and an alcohol produces

- A) an aldehyde B) a ketone
 C) an ether **D) an ester**

27. Which formula correctly represents an ester?

- A) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ B) CH_3COCH_3
C) $\text{CH}_3\text{COOCH}_3$ D) $\text{CH}_3\text{CH}_2\text{COOH}$

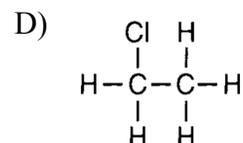
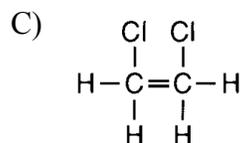
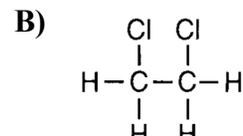
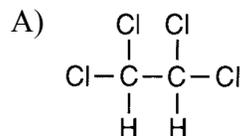
28. In the reaction



the organic compound formed is

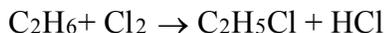
- A) an aldehyde B) a ketone
 C) an acid **D) an ether**

29. Which formula represents the product of the addition reaction between ethene and chlorine, Cl_2 ?



Review Organic Reactions

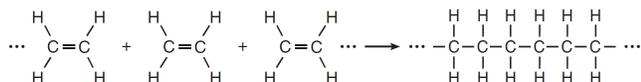
30. Given the equation:



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

31. Given the equation:



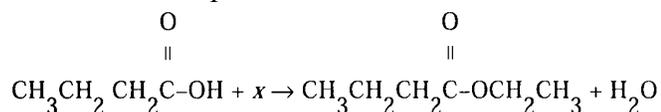
Which type of reaction is represented by this equation?

- A) combustion
- B) esterification
- C) polymerization**
- D) substitution

32. Cellulose, protein, and starch are classified as

- A) aldehydes
- B) esters
- C) synthetic polymers
- D) natural polymers**

33. Given the incomplete reaction:



Which compound is represented by x ?

- A) $\text{CH}_3\text{CH}_2\text{OH}$
- B) $\text{CH}_3\text{C}-\text{H}$
- C) $\begin{array}{c} \text{O} \\ || \\ \text{CH}_3\text{OCH}_2\text{CH}_3 \end{array}$
- D) $\begin{array}{c} \text{O} \\ || \\ \text{CH}_3\text{CCH}_3 \end{array}$

34. In which organic reaction is sugar converted to an alcohol and carbon dioxide?

- A) esterification
- B) addition
- C) substitution
- D) fermentation**

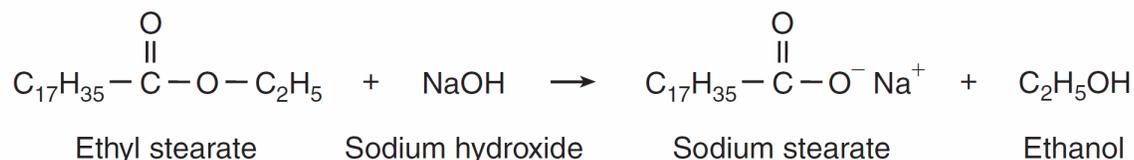
35. When hydrocarbons burn completely in an excess of oxygen, the products are

- A) carbon monoxide and water
- B) carbon dioxide and water**
- C) carbon monoxide and carbon dioxide
- D) carbon dioxide and carbon

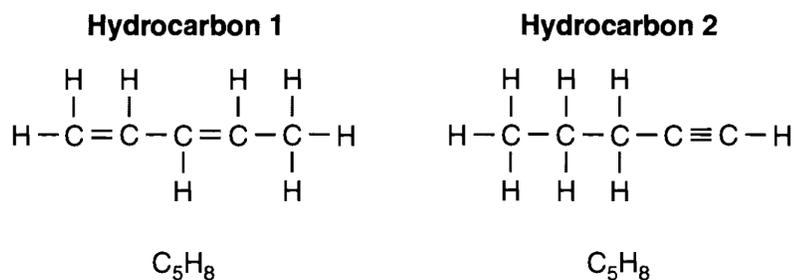
Review Organic Reactions

Base your answers to questions 36 through 38 on information below.

One type of soap is produced when ethyl stearate and sodium hydroxide react. The soap produced by this reaction is called sodium stearate. The other product of the reaction is ethanol. This reaction is represented by the balanced equation below.

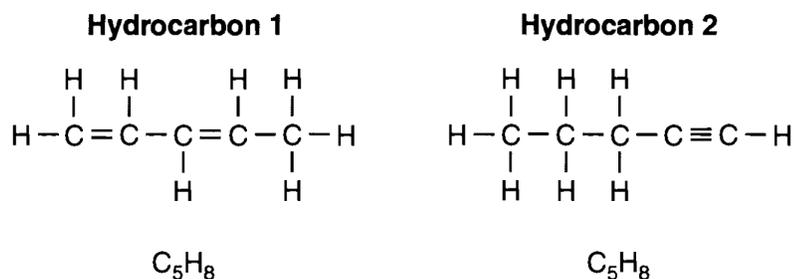


36. Identify the *two* types of bonds in the compound sodium stearate.
37. To which class of organic compounds does ethyl stearate belong?
38. Identify the type of organic reaction used to make soap.
-
39. Two hydrocarbons that are isomers of each other are represented by the structural formulas and molecular formulas below.



Explain, in terms of structural formulas and molecular formulas, why these hydrocarbons are isomers of each other.

40. Two hydrocarbons that are isomers of each other are represented by the structural formulas and molecular formulas below.



Explain, in terms of bonds, why these hydrocarbons are unsaturated.

Review Organic Reactions

Base your answers to questions **41** and **42** on the information below.

Gasoline is a mixture composed primarily of hydrocarbons such as isooctane, which is also known as 2,2,4-trimethylpentane.

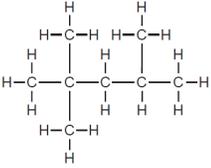
Gasoline is assigned a number called an octane rating. Gasoline with an octane rating of 87 performs the same as a mixture that consists of 87% isooctane and 13% heptane.

An alternative fuel, E-85, can be used in some automobiles. This fuel is a mixture of 85% ethanol and 15% gasoline.

41. In the space below, draw a structural formula for a molecule of 2,2,4-trimethylpentane.
 42. Identify the functional group in a molecule of ethanol in the alternative fuel E-85.
-

Answer Key

Organic Chemistry Review

- | | | |
|-----|----------|--|
| 1. | <u>A</u> | |
| 2. | <u>B</u> | |
| 3. | <u>B</u> | |
| 4. | <u>D</u> | |
| 5. | <u>A</u> | |
| 6. | <u>C</u> | |
| 7. | <u>A</u> | |
| 8. | <u>D</u> | |
| 9. | <u>A</u> | |
| 10. | <u>A</u> | |
| 11. | <u>C</u> | |
| 12. | <u>C</u> | |
| 13. | <u>B</u> | |
| 14. | <u>C</u> | |
| 15. | <u>A</u> | |
| 16. | <u>A</u> | |
| 17. | <u>D</u> | |
| 18. | <u>D</u> | |
| 19. | <u>B</u> | |
| 20. | <u>D</u> | |
| 21. | <u>B</u> | |
| 22. | <u>B</u> | |
| 23. | <u>C</u> | |
| 24. | <u>C</u> | |
| 25. | <u>D</u> | |
| 26. | <u>D</u> | |
| 27. | <u>C</u> | |
| 28. | <u>D</u> | |
| 29. | <u>B</u> | |
| 30. | <u>C</u> | |
| 31. | <u>C</u> | |
| 32. | <u>D</u> | |
| 33. | <u>A</u> | |
| 34. | <u>D</u> | |
| 35. | <u>B</u> | |
| 36. | | —covalent bonds and ionic bonds —polar and nonpolar —single and double |
| 37. | | ester <i>or</i> esters |
| 38. | | saponification |
| 39. | | The molecular formulas of the two hydrocarbons are the same, but the structural formulas are different. |
| 40. | | —A hydrocarbon 1 molecule has two carbon-carbon double bonds and a hydrocarbon 2 molecule has one carbon-carbon triple bond. —Both hydrocarbons have at least one multiple covalent bond between two carbon atoms. |
| 41. | |  |
| 42. | | —OH <i>or</i> alcohol <i>or</i> hydroxyl |