

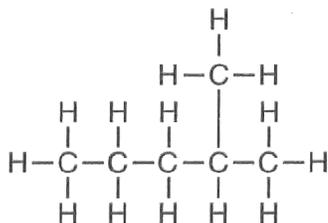
1. Which compound is a saturated hydrocarbon?

- A) propanal B) propane
C) propene D) propyne

2. Which compound is a member of the same homologous series as C_3H_8 ?

- A) CH_4 B) C_4H_8 C) C_5H_8 D) C_5H_{10}

3. What is the IUPAC name of the organic compound that has the formula shown below?



- A) 1,1-dimethylbutane B) 2-methylpentane
C) hexane D) 4-methylpentane

4. Hydrocarbons are compounds that contain

- A) carbon, only
B) carbon and hydrogen, only
C) carbon, hydrogen, and oxygen, only
D) carbon, hydrogen, oxygen, and nitrogen, only

5. Which formula represents an unsaturated hydrocarbon?

- A) B)
C) D)

6. A double carbon-carbon bond is found in a molecule of

- A) pentane B) pentene
C) pentyne D) pentanol

7. Which general formula represents the compound CH_3CH_2CCH ?

- A) C_nH_n B) C_nH_{2n}
C) C_nH_{2n-2} D) C_nH_{2n+2}

8. Which compound is an unsaturated hydrocarbon?

- A) hexanal B) hexane
C) hexanoic acid D) hexyne

9. 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

10. Functional groups are used to classify

- A) organic compounds
B) inorganic compounds
C) heterogeneous mixtures
D) homogeneous mixtures

11. 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

12. Which element is present in all organic compounds?

- A) carbon B) hydrogen
C) nitrogen D) oxygen

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

- A) CH_3CH_2Cl and CH_3CH_2Br
B) CH_3CHCH_2 and $CH_3CH_2CH_3$
C) CH_3CHO and CH_3COCH_3
D) CH_3CH_2OH and CH_3OCH_3

14. Which structural formula is incorrect?

- A) B)
C) D)

15. The four single bonds of a carbon atom are directed in space toward the corners of a

- A) regular tetrahedron B) regular octahedron
C) square plane D) trigonal bipyramid

16. 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	X		X	
Low Melting Point		X		X
Soluble in Water	X			X
Insoluble in Water		X	X	
Decomposed under High Heat	X			
Stable under High Heat	X		X	X
Electrolyte	X			X
Nonelectrolyte		X	X	

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

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

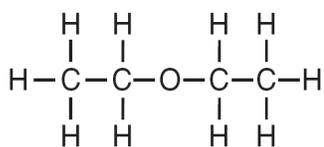
17. Organic compounds that are essentially non-polar and exhibit weak intermolecular forces have

- A) low vapor pressure
 B) low melting points
 C) high boiling points
 D) high electrical conductivity in solution

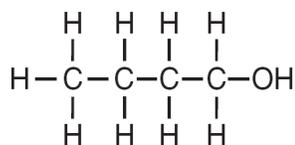
18. The two isomers of butane have different

- A) formula masses B) empirical formulas
 C) molecular formulas D) structural formulas

19. Given the formulas for two compounds:



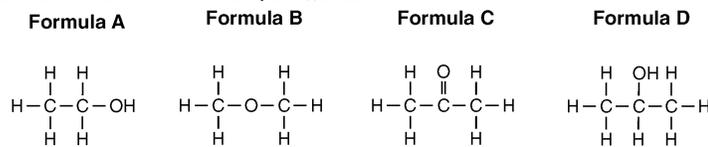
and



These compounds differ in

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

20. Given the structural formulas:



Which two formulas represent compounds that are isomers of each other?

- A) A and B B) A and C
 C) B and D D) C and D

21. Which pair of compounds are isomers?

- A) NO₂ and N₂O₄
 B) P₂O₅ and P₄O₁₀
 C) HCOOH and CH₃COOH
 D) CH₃OCH₃ and C₂H₅OH

22. Which compound is an isomer of pentane?

- A) butane B) propane
 C) methyl butane D) methyl propane

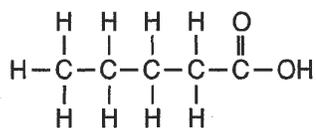
23. What is the total number of pairs of electrons represented by dashes (-) in the structural formula
 $\text{H} - \text{C} = \text{C} - \text{H}$?

- A) 10 B) 8 C) 5 D) 4

24. The functional group -COOH is found in

- A) esters B) aldehydes
 C) alcohols D) organic acids

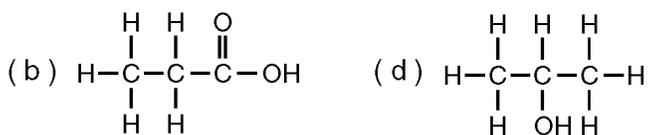
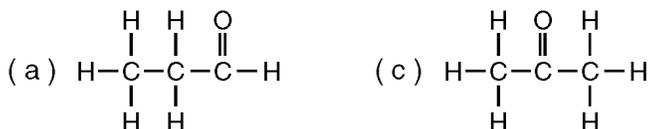
25. Given the formula for an organic compound:



This compound is classified as an

- A) aldehyde B) amine
C) ester D) organic acid

26. 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

27. What is the IUPAC name for the compound that has the condensed structural formula $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$?

- A) butanal B) butanol
C) propanal D) propanol

28. Which functional group, when attached to a chain of carbon atoms, will produce an organic molecule with the characteristic properties of an aldehyde?

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

29. Which of these compounds has chemical properties most similar to the chemical properties of ethanoic acid?

- A) $\text{C}_3\text{H}_7\text{COOH}$ B) $\text{C}_2\text{H}_5\text{OH}$
C) $\text{C}_2\text{H}_5\text{COOC}_2\text{H}_5$ D) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$

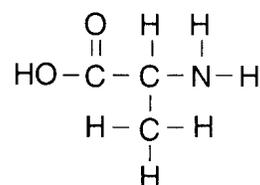
30. The general formula $\text{R}-\text{COOH}$ represents a class of compounds called

- A) alkanes B) alkenes
C) acids D) alcohols

31. Which compound is an alcohol?

- A) propanal B) ethyne
C) butane D) methanol

32. The molecule below belongs to which class of compounds?



- A) alcohol B) ester
C) aldehyde D) amino acid

33. A solution of acetic acid

- A) contains molecules only
B) has a pH of 7
C) turns red litmus to blue
D) conducts electricity

34. If a compound contains only one $-\text{OH}$ functional group attached to the end carbon in the chain, it is classified as a

- A) primary alcohol B) secondary alcohol
C) tertiary alcohol D) dihydroxy alcohol

35. An example of a secondary alcohol is

- A) 1-propanol B) 2-propanol
C) 1,2-propanediol D) 1,2,3-propanetriol

36. The compound 1,2-ethanediol is a

- A) monohydroxy alcohol B) dihydroxy alcohol
C) primary alcohol D) secondary alcohol

37. Which is the correct structural formula for glycerol?

- A) $\begin{array}{c} \text{H} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{H} \end{array}$ B) $\begin{array}{c} \text{H} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{H} \end{array}$
C) $\begin{array}{c} \text{OH} \\ | \\ \text{HO}-\text{C}-\text{OH} \\ | \\ \text{H} \end{array}$ D) $\begin{array}{c} \text{H} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{H} \end{array}$

38. Which formula represents a ketone?

- A) CH_3COOH B) $\text{C}_2\text{H}_5\text{OH}$
C) CH_3COCH_3 D) $\text{CH}_3\text{COOCH}_3$

39. Which structural formula represents a secondary alcohol?

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

40. Which class of compounds contains at least one element from Group 17 of the Periodic Table?

- A) aldehyde B) amine
C) ester D) halide

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

- A) $\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{H}-\text{C}-\text{C}-\text{H} \\ | \quad | \\ \text{Br} \quad \text{Br} \end{array}$
- B) $\begin{array}{c} \text{Br} \quad \text{H} \\ | \quad | \\ \text{H}-\text{C}-\text{C}-\text{H} \\ | \quad | \\ \text{Br} \quad \text{H} \end{array}$
- C) $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ | \quad | \quad | \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ | \quad | \quad | \\ \text{Br} \quad \text{Br} \quad \text{H} \end{array}$
- D) $\begin{array}{c} \text{Br} \quad \text{H} \quad \text{H} \\ | \quad | \quad | \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ | \quad | \quad | \\ \text{Br} \quad \text{H} \quad \text{H} \end{array}$

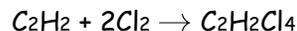
42. Which compound is an ester?

- A) CH_3OH B) CH_3COOH
C) CH_3OCH_3 D) $\text{CH}_3\text{COOCH}_3$

43. 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) CH_3-OH

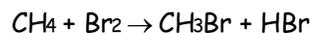
44. Given the balanced equation for an organic reaction:



This reaction is best classified as

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

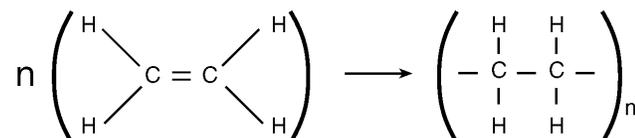
45. Given the equation:



Which type of reaction does this equation represent?

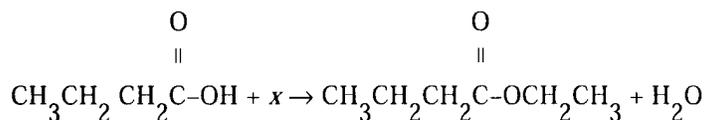
- A) addition B) hydrogenation
C) polymerization D) substitution

46. Which type of reaction is represented by the equation below?

 Note: n and n are very large numbers equal to about 2000.


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

47. 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) $\text{CH}_3\overset{\text{O}}{\parallel}{\text{C}}\text{CH}_3$ D) $\text{CH}_3\text{OCH}_2\text{CH}_3$

48. An alcohol and an organic acid are combined to form water and a compound with a pleasant odor. This reaction is an example of

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

49. Which of the following occurs when yeast breaks down glucose into alcohol and carbon dioxide?

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

50. In which reaction is soap a product?

- A) addition
- B) substitution
- C) saponification
- D) polymerization