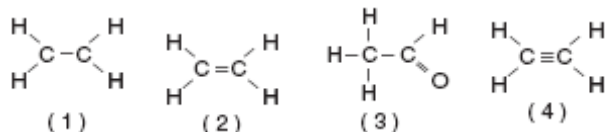


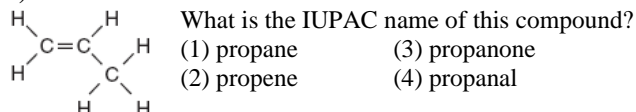
1) Which structural formula correctly represents a hydrocarbon molecule?



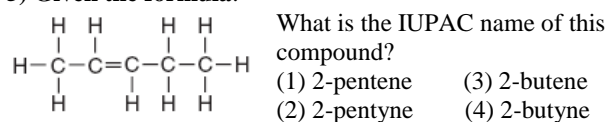
2) How many hydrogen atoms are present in one molecule of octane?

3) To which homologous series does $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ belong?

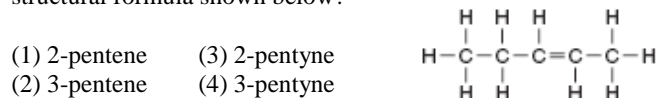
4) Given the structural formula:



5) Given the formula:

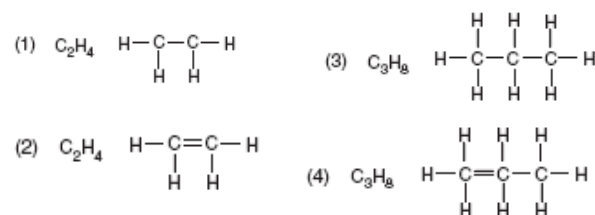


6) What is the IUPAC name of the compound with the structural formula shown below?

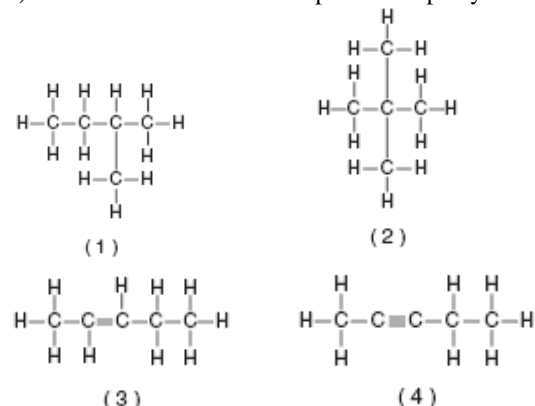


7) Identify the homologous series of hydrocarbons to which CH_3CHCH_2 belongs.

8) The empirical formula of a compound is CH_2 . Which molecular formula is correctly paired with a structural formula for this compound?

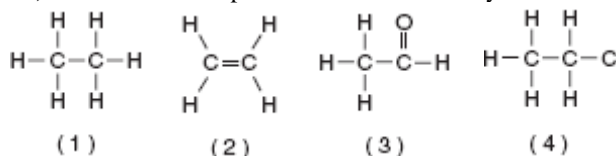


9) Which structural formula represents 2-pentyne?

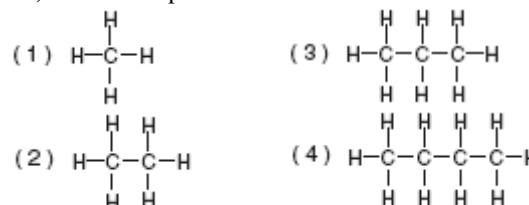


10) How is the bonding between carbon atoms different in unsaturated hydrocarbons and saturated hydrocarbons?

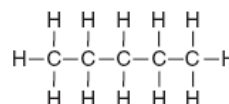
11) Which formula represents an unsaturated hydrocarbon?



12) Which compound has an isomer?

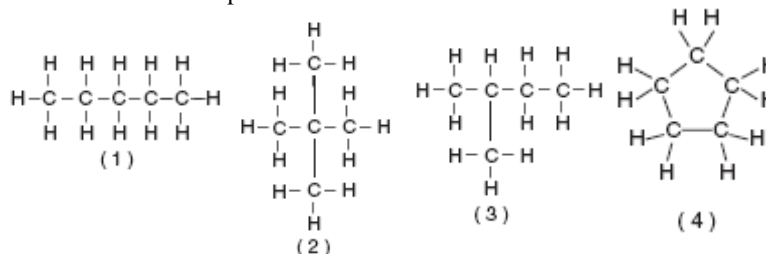


13) Given the structural formula of pentane:

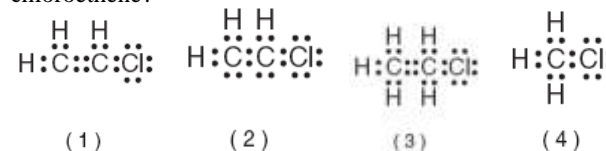


In the space below, draw a structural formula for an isomer of pentane.

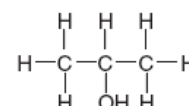
14) Which structural formula represents a molecule that is not an isomer of pentane?



15) Which Lewis electron-dot diagram represents chloroethene?

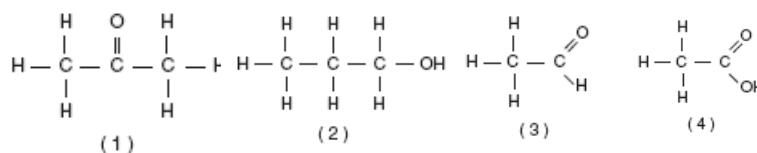


16) Which type of organic compound is represented by the structural formula shown to the right?



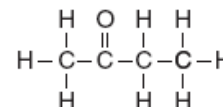
(1) aldehyde (2) alcohol (3) ether (4) ester

17) Which structural formula represents an alcohol?



18) What is the IUPAC name of the compound with the following structural formula?

(1) propanone
 (2) propanal
 (3) butanone
 (4) butanal

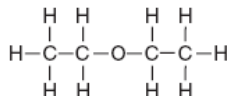


19) In the space below, draw the structural formula for propanone.

20) In the space below, draw the structural formula for butanoic acid.

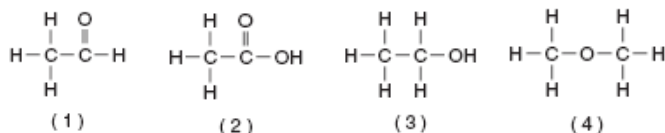
21) Given the structural formula:

The compound represented by this formula can be classified as an

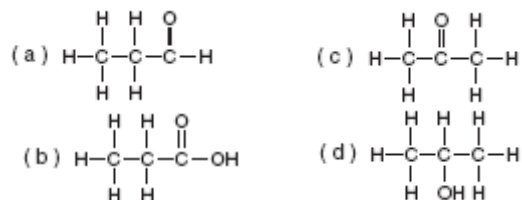


(1) organic acid (2) ether (3) ester (4) aldehyde

22) Which structural formula represents an ether?



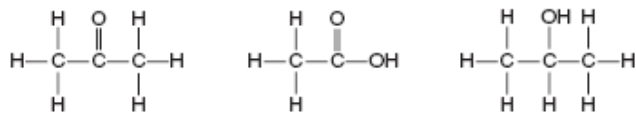
23) Given the formulas of four organic compounds:



Which pair below contains an alcohol and an acid?

(1) a and b (2) a and c (3) b and d (4) c and d

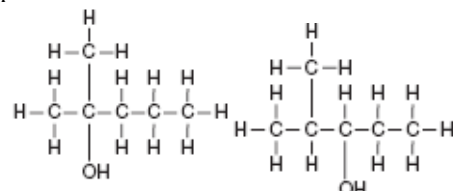
24) Given the three organic structural formulas shown below:



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

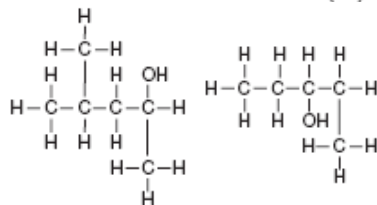
(1) ester, organic acid, ketone
 (2) ester, aldehyde, organic acid
 (3) ketone, aldehyde, alcohol
 (4) ketone, organic acid, alcohol

25) Which structural formula is correct for 2-methyl-3-pentanol?



(1)

(2)



(3)

(4)

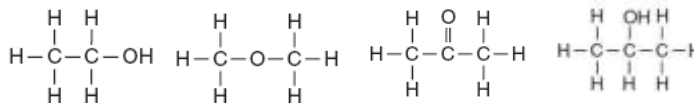
26) Given the structural formulas:

Formula A

Formula B

Formula C

Formula D



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

(1) A and B (2) A and C (3) B and D (4) C and D

Base your answers to questions 27 and 28 on the information below.

27) Diethyl ether is widely used as a solvent.

In the space below, draw the structural formula for diethyl ether.

28) In the space below, draw the structural formula for an alcohol that is an isomer of diethyl ether.

29) Given the structural formulas for two organic compounds:



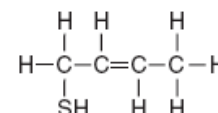
The differences in their physical and chemical properties are primarily due to their different

(1) number of carbon atoms (3) molecular masses
 (2) number of hydrogen atoms (4) functional groups

Base your answer to question 30 on the information below.

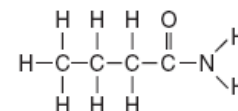
A thiol is very similar to an alcohol, but a thiol has a sulfur atom instead of an oxygen atom in the functional group. One of the compounds in a skunk's spray is 2-butene-1-thiol. The formula of this compound is shown below.

30) Explain, in terms of composition, why this compound is a thiol.



31) Given the formula:

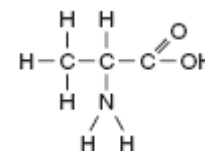
This compound is classified as
 (1) an aldehyde (3) an amine
 (2) an amide (4) a ketone



32) Given the structural formula:

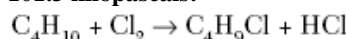
This structural formula represents a molecule of

(1) an aldehyde (3) a ketone
 (2) an ester (4) an amino acid



Base your answers to questions 33 and 34 on the information below.

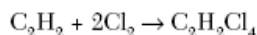
Given the balanced equation for an organic reaction between butane and chlorine that takes place at 300.°C and 101.3 kilopascals:



33) Identify the type of organic reaction shown.

34) In the space below, draw a structural formula for the organic product.

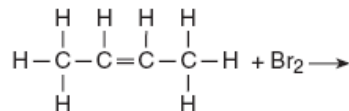
35) Given the balanced equation for an organic reaction:



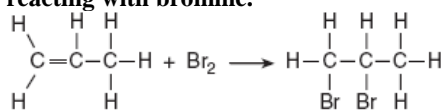
This reaction is best classified as

- (1) addition (3) fermentation
(2) esterification (4) substitution

36) In the space to the right of the reactants and arrow below, draw the structural formula for the product of the reaction shown.



Base your answers to questions 37 through 39 on the equation below, which represents an organic compound reacting with bromine.

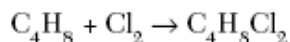
37) What is the IUPAC name for the organic compound that reacts with Br₂?

38) What type of organic reaction is represented by this equation?

39) What is the gram-formula mass of the product in this reaction?

Base your answers to questions 40 and 41 on the information below.

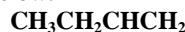
Given the reaction between 1-butene and chlorine gas:



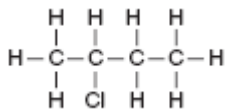
40) Which type of chemical reaction is represented by this equation?

41) In the space below, draw the structural formula of the product 1,2-dichlorobutane.

Base your answers to questions 42 and 43 on the condensed structural formula below.

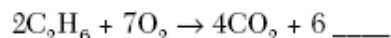


42) In the space below, draw the structural formula for this compound.

43) The formula below represents a product formed when HCl reacts with CH₃CH₂CHCH₂.

What is an IUPAC name for this product?

44) Given the incomplete equation for the combustion of ethane:



Which substance will be the missing product?

- (1) CH₃OH (2) HCOOH (3) H₂O (4) H₂O₂

45) Given the equation:

butanoic acid + 1-pentanol $\xrightarrow{\text{catalyst}}$ water + X
To which class of organic compounds does product X belong?

46) Given the reaction:

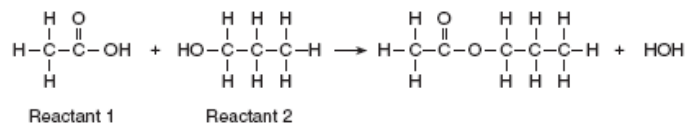


This reaction is an example of

- (1) fermentation (3) hydrogenation
(2) saponification (4) esterification

Base your answers to questions 47 through 49 on the information below.

Many artificial flavorings are prepared using the type of organic reaction shown below.



47) What is the name of this organic reaction?

48) To what class of organic compounds does reactant 2 belong?

49) In the space below, draw the structural formula of an isomer of reactant 2.

Base your answers to questions 50 and 51 on the information below.

Methyl butanoate is an ester that has an odor like pineapple and ethyl methanoate is an ester that has an odor like raspberry.

50) In the space below, draw a structural formula for the ester that has an odor like pineapple.

51) What is a chemical name for the alcohol that reacts with methanoic acid to produce the ester that has an odor like raspberry?

52) Which type of reaction is represented by the equation below? (Note: n and n are very large numbers equal to about 2000.)

- (1) esterification
(2) fermentation
(3) saponification
(4) polymerization

