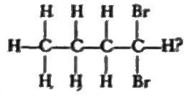
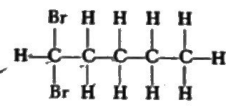
Name: KEY **Off. Class:** _____ **Per:** _____ **Date:** _____

Teacher: _____ **Isomer Practice** **Chemistry**

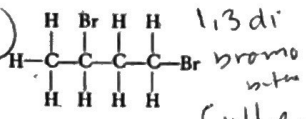
B 1. Which structural formula represents a compound that is an isomer of



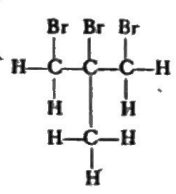
$C_4H_8Br_2$ 1,1, dibromo butane

A) 

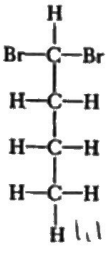
1,1 dibromo pentane $C_5H_{10}Br_2$

B) 

1,3 di bromo butane $C_4H_8Br_2$

C) 

$C_4H_7Br_3$

D) 

$C_4H_8Br_2$ 1,1 dibromo butane

D 2. Which is an isomer of 2-chloropropane?

A) butane B) propane

C) 1-chlorobutane D) 1-chloropropane

Cl just changed location.

D 3. Which is an isomer of $CH_3CH_2CH_2COOH$?

$C_4H_{10}O$ ($C_4H_8O_2$)

A) $CH_3CH_2OCH_2CH_3$

B) $CH_3CH_2CH_2OCH_3$ $C_4H_{10}O$

C) $CH_3CH_2CH_2CH_2OH$ $C_4H_{10}O$

D) $CH_3COOCH_2CH_3$ $C_4H_8O_2$

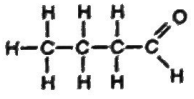
B 4. Which compound is an isomer of C_4H_9OH? $C_4H_{10}O$

C_4H_{10}

A) $C_3H_7CH_3$ B) $C_2H_5OC_2H_5$ $C_4H_{10}O$

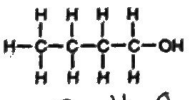
C) $C_2H_5COOC_2H_5$ $C_5H_{10}O_2$ D) CH_3COOH $C_2H_4O_2$

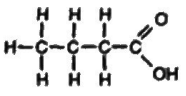
D 5. Given the compound:



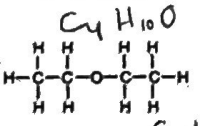
C_4H_8O

Which structural formula represents an isomer?

A) 

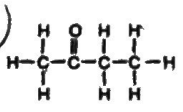
B) 

$C_4H_8O_2$

C) 

$C_4H_{10}O$

$C_4H_{10}O$

D) 

C_4H_8O

D 6. The two isomers of butane have different

A) formula masses B) empirical formulas

C) molecular formulas D) structural formulas

definition = same formula different structure

7. Two substances have different physical and chemical properties. Both substances have molecules that contain two carbon atoms, one oxygen atom, and six hydrogen atoms. These two substances must be

A) isomers of each other

B) isotopes of each other

C) the same compound

D) the same hydrocarbon

D 8. Which pair of compounds are isomers?

A) NO_2 and N_2O_4

B) P_2O_5 and P_4O_{10}

C) HCOOH and CH_3COOH

D) CH_3OCH_3 and C_2H_5OH C_2H_6O C_2H_6O

C 9. If two compounds are isomers, they must have the same

A) vapor pressure

B) boiling point

C) percentage composition made of same pieces

D) structure

D 10. Which is an isomer of the compound propanoic acid, CH_3CH_2COOH? $C_3H_6O_2$

A) $CH_2=CHCOOH$ $C_3H_4O_2$

B) $CH_3CH_2CH_2COOH$ $C_4H_8O_2$

C) $CH_3CH(OH)CH_2OH$ $C_3H_8O_2$

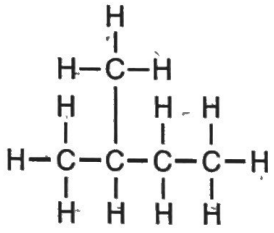
D) $HCOOCH_2CH_3$

$C_3H_6O_2$

KEY

11. Base your answer to the following question on the information below.

The formula below represents a hydrocarbon.

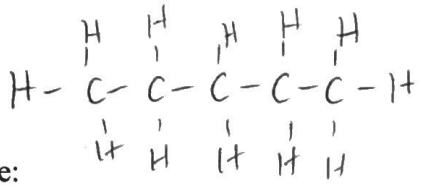


2 methyl butane

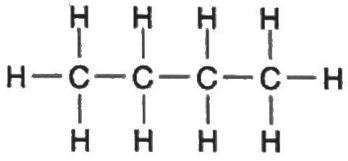
C_5H_{12}

In the space below, draw a structural formula for *one* isomer of this hydrocarbon.

pentane

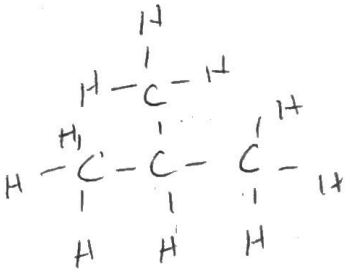


12. Given the structural formula for butane:



C_4H_{10}

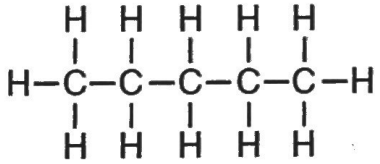
Draw the structural formula of an isomer of butane.



C_4H_{10}

2 methyl ~~propane~~

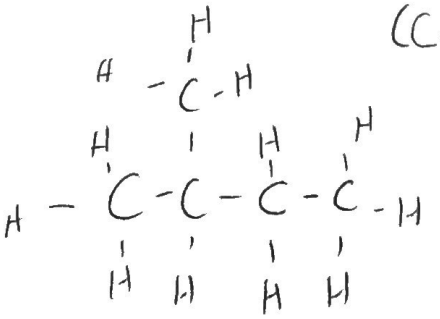
13. Given the structural formula of pentane:



(C_5H_{12})

Draw a structural formula for an isomer of pentane.

(C_5H_{12})

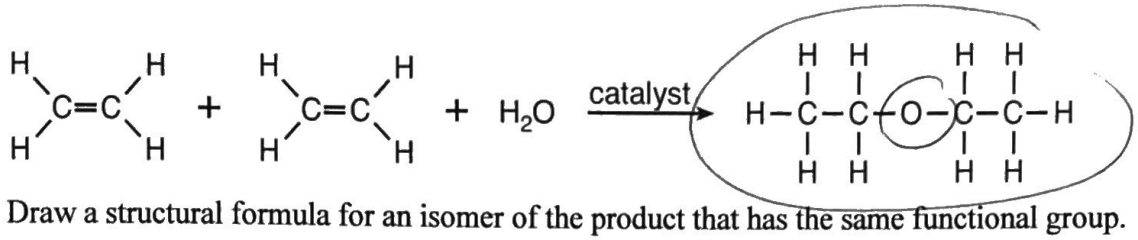


(2 methyl butane)

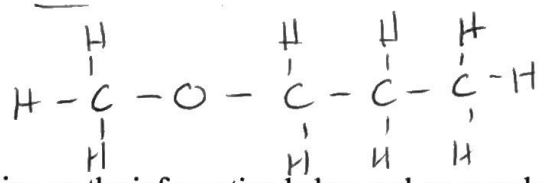
KEY

14. Base your answer to the following question on the information below and on your knowledge of chemistry.

Diethyl ether is used as a laboratory and industrial solvent. The boiling point of diethyl ether at standard pressure is 34.6°C. The equation below represents a reaction that produces diethyl ether.



Draw a structural formula for an isomer of the product that has the same functional group.



15. Base your answer to the following question on the information below and on your knowledge of chemistry.

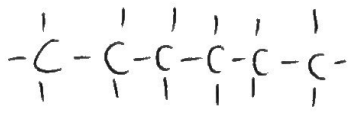
Water, H_2O, and hexane, C_6H_{14}, are commonly used as laboratory solvents because they have different physical properties and are able to dissolve different types of solutes. Some physical properties of water and hexane are listed on the table below.

Physical Properties of H_2O and C_6H_{14}

Solvent	Boiling Point (°C)	Melting Point (°C)	Vapor Pressure at 69°C (kPa)
H_2O	100.	0.	?
C_6H_{14}	69	–95	101.3

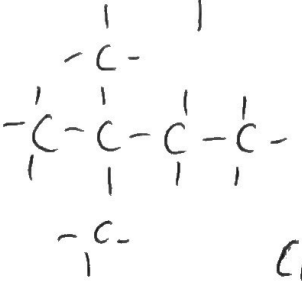
Explain, in terms of molecular formulas and structural formulas, why 2,2-dimethylbutane is an isomer of hexane.

Same chemical formula different structure.



hexane

C_6H_{14}

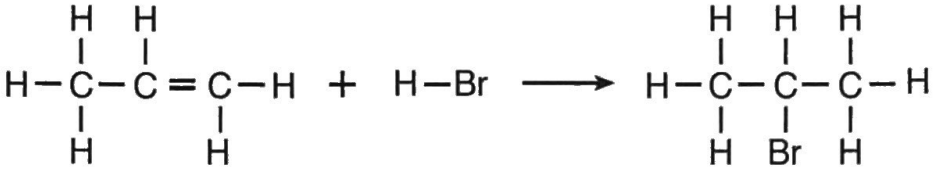


C_6H_{14}

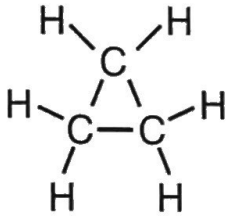
KEY

16. Base your answer to the following question on the information below and on your knowledge of chemistry.

The equation below represents a reaction between propene and hydrogen bromide.



Cyclopropane, an isomer of propene, has a boiling point of –33°C at standard pressure and is represented by the formula below.



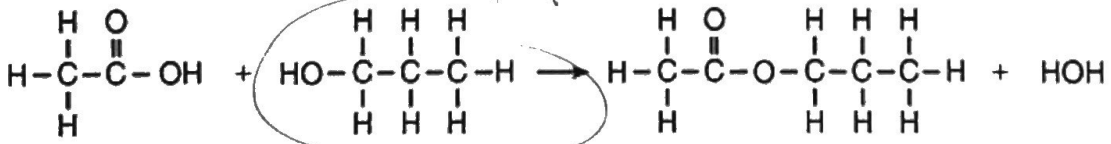
Explain, in terms of molecular formulas and structural formulas, why cyclopropane is an isomer of propene.

same molecular formula -
different structural formula

17. Base your answer to the following question on the information below.

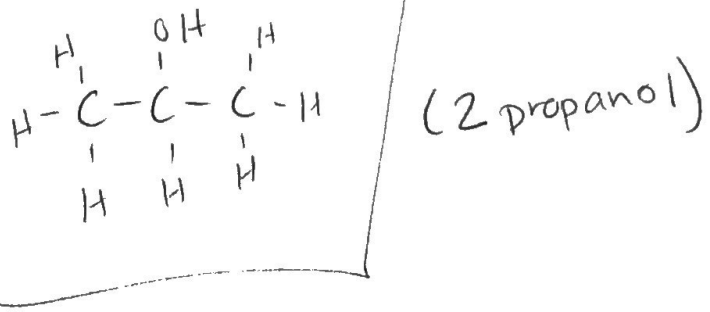
Many artificial flavorings are prepared using the type of organic reaction shown below.

1-propanol



Reactant 1 Reactant 2

Draw the structural formula of an isomer of reactant 2.



(2 propanol)

KEY

18. Base your answer to the following question on the information below.

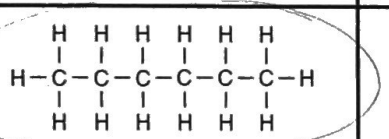
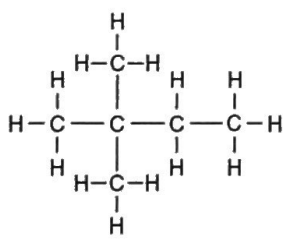
Biodiesel is an alternative fuel for vehicles that use petroleum diesel. Biodiesel is produced by reacting vegetable oil with CH_3OH. Methyl palmitate, $C_{15}H_{31}COOCH_3$, a compound found in biodiesel, is made from soybean oil. One reaction of methyl palmitate with oxygen is represented by the balanced equation below.

$$2C_{15}H_{31}COOCH_3 + 49O_2 \rightarrow 34CO_2 + 34H_2O + \text{energy}$$

Explain, in terms of *both* atoms and molecular structure, why there is no isomer of CH_3OH.

Base your answers to questions **19** and **20** on the information below and on your knowledge of chemistry.

There are several isomers of C_6H_{14}. The formulas and boiling points for two of these isomers are given in the table below.

Isomer	Formula	Boiling Point at 1 atm (°C)
1		68.7
2		49.7

19. Write the empirical formula for isomer 1.

simplest ratio

C_6H_{14} / 2

EF = C_3H_7

20. Explain, in terms of intermolecular forces, why isomer 2 boils at a lower temperature than isomer 1.

Isomer 2 has weaker IMF

Isomer 1 has higher IMF

Strong IMF = high BP

Weak IMF = low BP