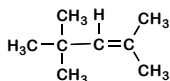
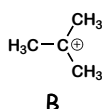
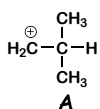
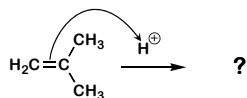




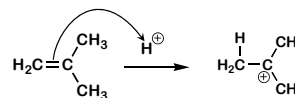
Use the curved arrow formalism to show the bond making and bond breaking of the first step of the following reaction.

Choose the structure of product of the first step.

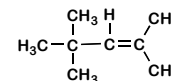


7

Use the curved arrow formalism to show the bond making and bond breaking of the first step of the following reaction.

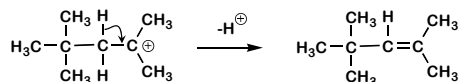
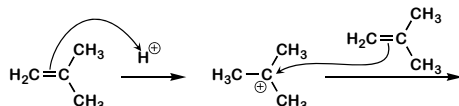


Is a carbocation an (A) acid or (B) base?



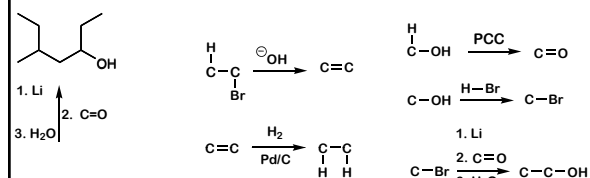
8

Use the curved arrow formalism to show the bond making and bond breaking of each step of the following reaction. Add formal charges to the atoms to make the structures correct.

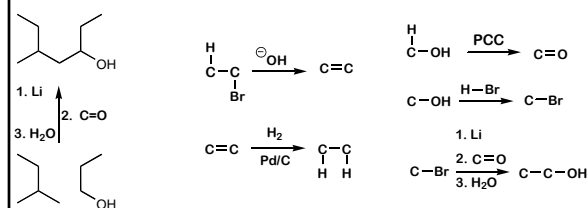


9

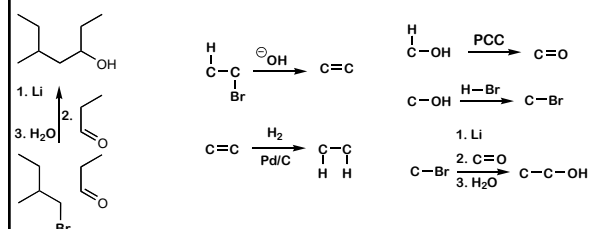
Propose a good synthesis of the following alcohol.



Propose a good synthesis of the following alcohol.



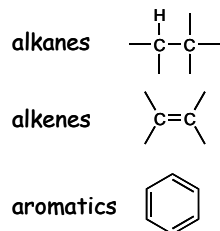
Propose a good synthesis of the following alcohol.





# Alkanes

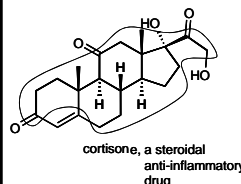
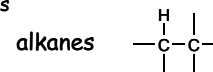
hydrocarbons are compounds containing only the elements C and H.



19

C—C and C—H bonds are notoriously unreactive. Why are they of interest to chemistry and biology?

1. Alkanes are the scaffolds upon which groups are attached to give functional molecules.

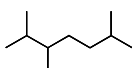


2. Hydrocarbons are very hydrophobic, they hate water. This property plays a very important role in the assembly of molecules to form functional structures.

20

Choose the correct formula for the following structure:

Nomenclature?



$$C_n H_{2n+2} = C_{10} H_{2(10)+2} = C_{10} H_{22}$$

$$n = 10$$

Any unambiguous name is acceptable.

trimethylheptane      2,3,6-trimethylheptane

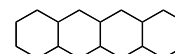
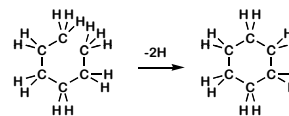
A.  $C_{10}H_{20}$    B.  $C_{10}H_{18}$    C.  $C_{10}H_{22}$    D.  $C_{10}H_{16}$    E.  $C_{10}H_{24}$

21

What is the index of hydrogen deficiency?

$$\text{alkane formula} = C_n H_{2n+2}$$

$$\text{cycloalkane formula} = C_n H_{2n+2 - 2(\text{number of rings})}$$



$C_{18}H_{38}$  = alkane

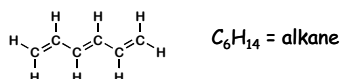
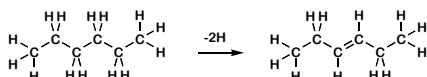
$$C_{18}H_{38-8} = C_{18}H_{30} = \text{cycloalkane}$$

What is the index of hydrogen deficiency?

$$\text{alkane formula} = C_n H_{2n+2}$$

$$\text{cycloalkane formula} = C_n H_{2n+2 - 2(\text{number of rings})}$$

$$\text{alkene formula} = C_n H_{2n+2 - 2(\text{number of double bonds})}$$



$$C_6H_{14-6} = C_6H_8 = \text{alkene}$$

What is the index of hydrogen deficiency?

$$\text{alkane formula} = C_n H_{2n+2}$$

$$\text{cycloalkane formula} = C_n H_{2n+2 - 2(\text{number of rings})}$$

$$\text{alkene formula} = C_n H_{2n+2 - 2(\text{number of double bonds})}$$

any hydrocarbon formula = alkane formula ( $C_n H_{2n+2}$ )

$$\left( \begin{array}{l} \text{alkanes} \\ \text{cycloalkanes} \\ \text{alkenes} \\ \text{alkynes} \end{array} \right) - 2(\text{number of rings} + \text{number of double bonds})$$

index of hydrogen deficiency = number of rings + number of double bonds

24

What is the index of hydrogen deficiency and formula of the following compound?



index of hydrogen deficiency = 1 ring + 1 double bond = 2  
 formula =  $C_8H_{18-2(2)} = C_8H_{14}$

- |    |   |             |
|----|---|-------------|
| A. | 0 | $C_8H_{14}$ |
| B. | 1 | $C_8H_{16}$ |
| C. | 2 | $C_8H_{14}$ |
| D. | 3 | $C_8H_{16}$ |
| E. | 2 | $C_8H_{18}$ |

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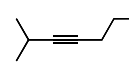
Which of the following structures have the formula  $C_8H_{14}$ ?



1



2



3

index of hydrogen deficiency = 2

A. = 2 and 3    B. = 1 and 3    C. = 3 only

D. = 2 only    E. = all    F. = none

26

text