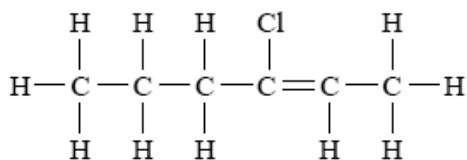


Organic chemistry 2012 VCE

1) The correct systematic name for the compound shown below is



- A. 2-chlorohex-2-ene
- B. 3-chlorohex-2-ene
- C. 3-chlorohex-3-ene
- D. 4-chlorohex-5-ene

Solution

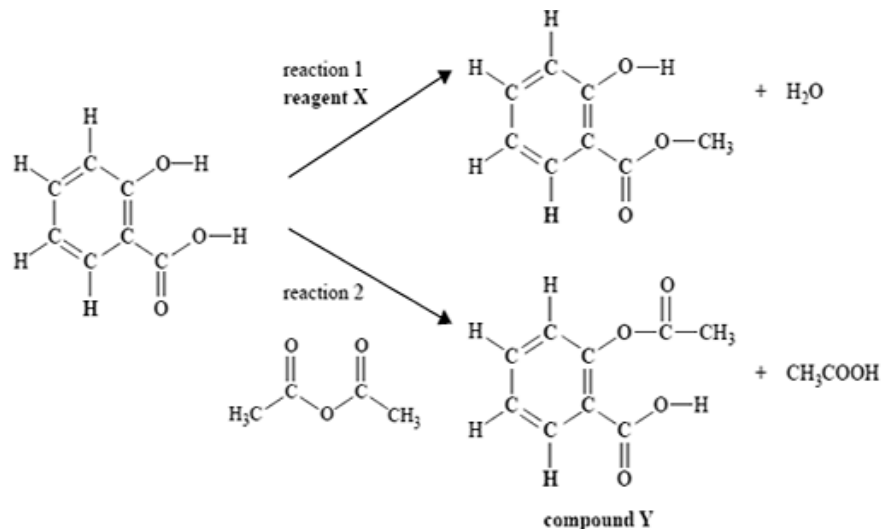
2) The number of structural isomers of C_4H_9Cl is

- A. 2
- B. 3
- C. 4
- D. 5

Solution

3) In the laboratory, salicylic acid can be used to produce two different compounds as shown in the diagram below.

These compounds are key components of pharmaceutical products.



4) Which one of the following correctly identifies reagent X and compound Y?

reagent X compound Y

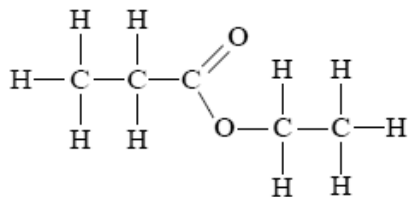
- A. X = methanol, Y = methyl salicylate
- B. X = methanoic acid, Y = methyl salicylate
- C. X = methanoic acid, Y = acetylsalicylic acid (aspirin)
- D. X = methanol, Y = acetylsalicylic acid (aspirin)

Solution

Solution will appear here

Solution will appear here

5) Which one of the following is the correct systematic name of the compound below?



Solution will appear here

- A. ethyl propanoate
- B. ethyl ethanoate
- C. propyl ethanoate
- D. propyl pentanoate

Solution

6) 2.1 g of an alkene that contains only one double bond per molecule reacted completely with 8.0 g of bromine, Br₂.

The molar mass of bromine, Br₂, is 160 g mol⁻¹.

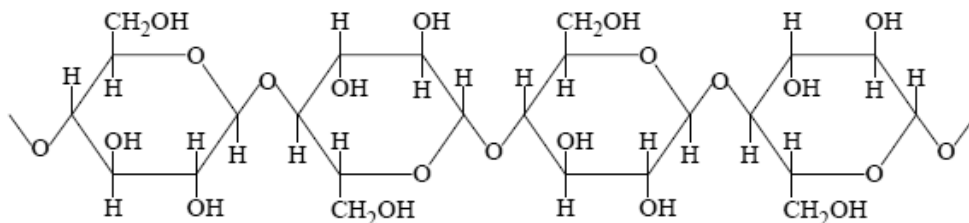
Which one of the following is the molecular formula of the alkene?

Solution will appear here

- A. C₅H₁₀
- B. C₄H₈
- C. C₃H₆
- D. C₂H₄

Solution

7) The cellulose that is present in plant matter cannot be directly fermented to produce bioethanol. The cellulose polymer must first be broken down into its constituent monomers. A section of cellulose polymer is shown below.



i) What is the name of the monomer from which cellulose is formed?

Solution

ii) Complete the following chemical equation to show the formation of ethanol by fermentation of the cellulose monomer.

Solution will appear here



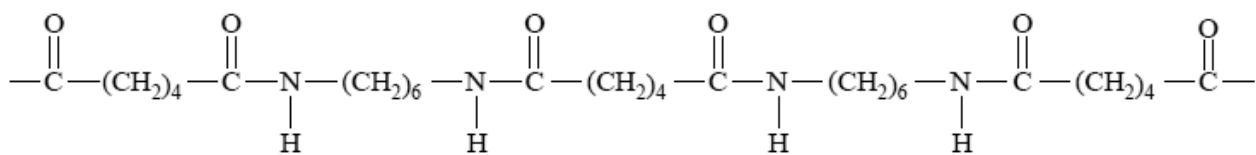
Solution

iii) Ethanol can be manufactured directly from ethene gas in the presence of a catalyst. Write a balanced

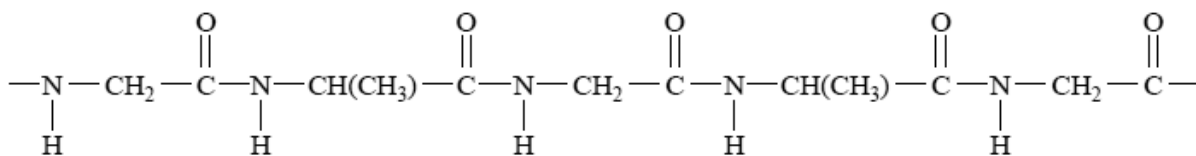
equation for this reaction.

Solution

8) Sections of the primary structure of nylon and the primary structure of a protein are shown below.

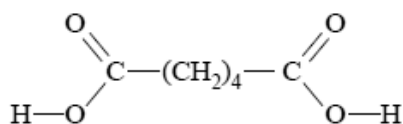


nylon



protein

i) Nylon is composed of two monomers. The structure of one of the monomers is provided below.



a. Draw the structure of the other monomer.

Solution will appear here

Solution

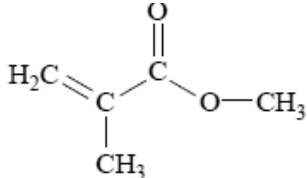
ii) Name the functional groups that link the monomers in
a) nylon.
b) protein.

Solution

iii) Look carefully at the functional group that links monomers in protein and nylon. The functional groups that connect the protein monomers are oriented in the same direction. The functional groups that link the nylon monomers are oriented in opposing directions. Explain why the functional groups that link the monomers in protein are oriented differently from the functional groups that link the monomers in nylon. Make appropriate reference to the structures of nylon and protein monomers in your answer.

Solution

iv) Perspex (polymethyl methacrylate) is a clear, colourless polymer used for optical applications. The structural formula of the only monomer used in the synthesis of perspex, methyl methacrylate, is shown below.



Draw a section of the polymer showing at least two units of the monomer.

Solution

7) i) Give the systematic names of the alkanol and the carboxylic acid that are required to synthesise propyl propanoate.

Solution

ii) Write a balanced chemical equation for the synthesis of propyl propanoate. Use the semi-structural formula for the reactants and products

Solution

Solution will appear here

iii) Describe the steps that are required to prepare a sample of **pure** propyl propanoate using **only** a pure sample of the alkanol as the starting reagent. Include any reagents that are used in the synthesis. An annotated flow chart may be used in your answer.

Solution

iv) Identify one method that could be used to verify that the substance produced is pure propyl propanoate. Explain how this method would indicate that the product is pure propyl propanoate.

Solution