

# **Chapter 24 & 25**

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# Chapter 24 & 25

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graph TD; A[Chapter 24 & 25] --- B[Aliphatic Hydrocarbons]; A --- C[Aromatic Hydrocarbons]; B --- D[Functional Group]; B --- E[Proteins];
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Aliphatic  
Hydrocarbons

Aromatic  
Hydrocarbons

Functional  
Group

Proteins

# Aliphatic Hydrocarbons

Name	Definition	General Formula	Naming
Alkane	Only single covalent bonds are present	$C_nH_{2n+2}$ $n = 1, 2, \dots$	<b>-ane</b>
Cycloalkanes	The carbon atoms are joined in rings	$C_nH_{2n}$ $n = 3, 4, \dots$	<b>Cyclo.....ane</b>
Alkenes	contain at least one C-C double bond	$C_nH_{2n}$ $n = 2, 3, \dots$	<b>-ene</b>
Alkynes	contain at least one C-C triple bond	$C_nH_{2n-2}$ $n = 2, 3 \dots$	<b>-yne</b>

Q.  $C_3H_8$  is the formula of an

- A. Alkane
- B. Alkene
- C. Alkyne
- D. Benzene

The general formula for an alkane is  $C_nH_{2n+2}$   
 $C_3H_{2 \times 3 + 2}$   
 $C_3H_8$

Q.  $C_2H_4$  is the formula of an

- A. Alkane
- B. Alkene
- C. Alkyne
- D. Cycle alkane

The general formula for an alkane is  $C_nH_{2n}$   
 $C_2H_{2 \times 2}$   
 $C_2H_4$

**Notice:** Choice D is incorrect because the general formula for a cycloalkane is  $C_nH_{2n}$  ( $n=3,4,5,\dots$ )

Which of these molecules is *unsaturated*

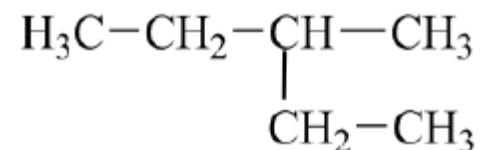
- A.  $\text{CH}_4$
- B.  $\text{C}_2\text{H}_6$
- C.  $\text{C}_4\text{H}_6$
- D.  $\text{C}_5\text{H}_{12}$

Which one of these hydrocarbons does *not* have structural isomers?

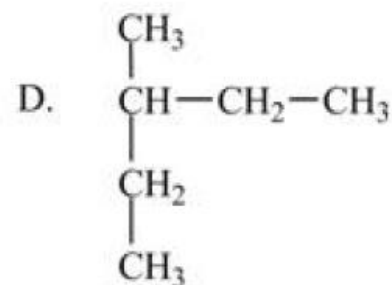
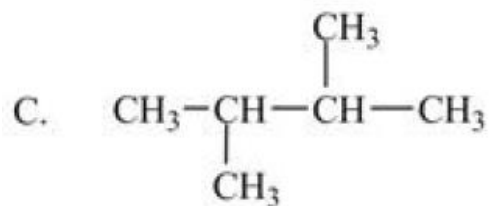
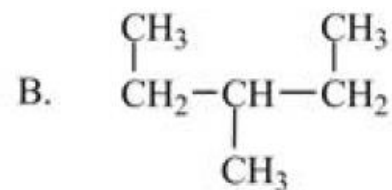
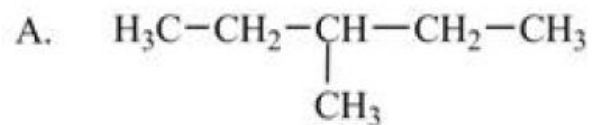
- A.  $\text{C}_7\text{H}_{16}$
- B.  $\text{C}_5\text{H}_{10}$
- C.  $\text{C}_4\text{H}_8$
- D.  $\text{C}_2\text{H}_6$

Because methane, ethane and propane do not have structural isomers

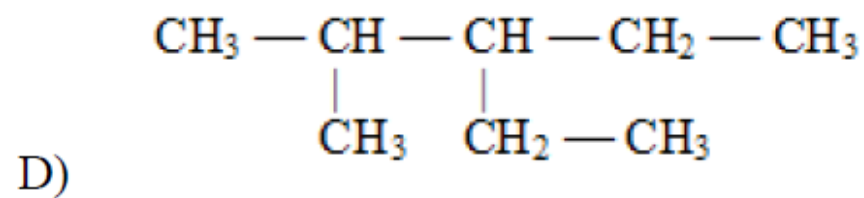
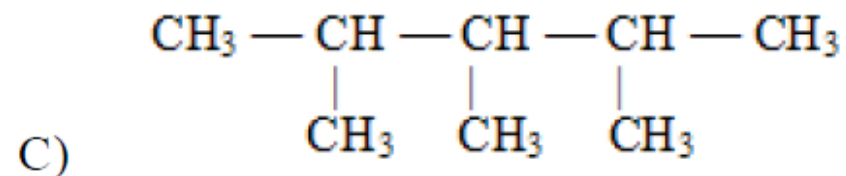
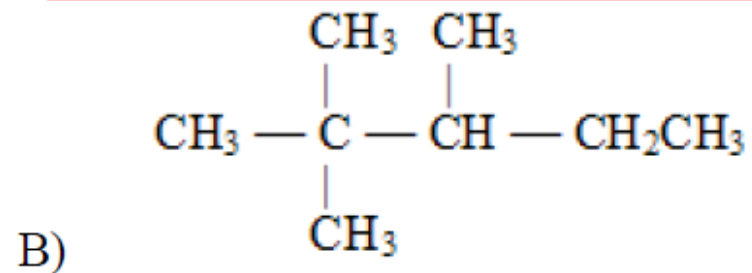
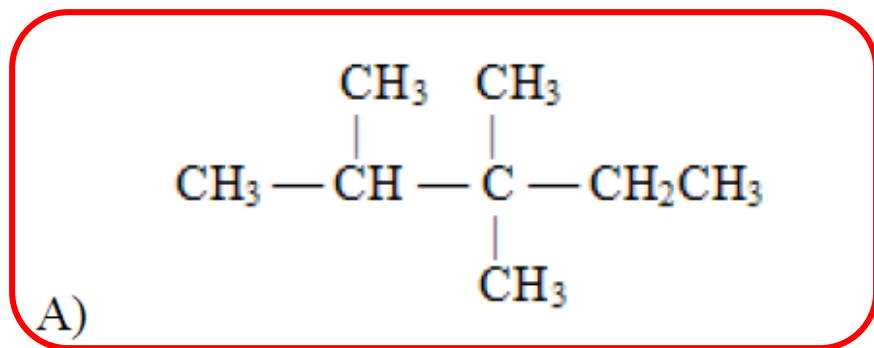
A particular *structural isomer* of  $C_6H_{14}$  is shown below



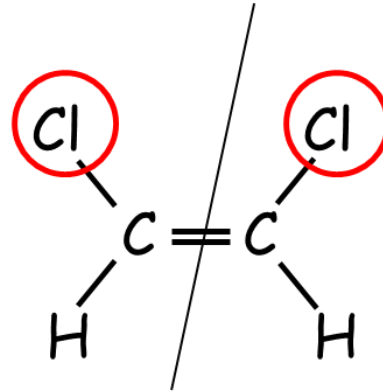
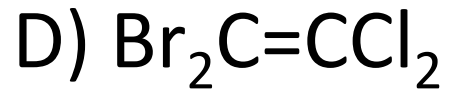
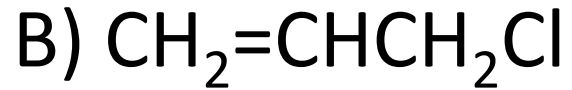
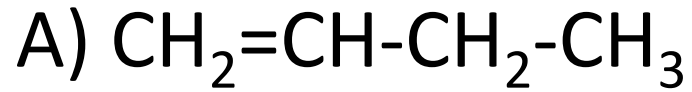
Which of the following structures represents a different structural isomer of  $C_6H_{14}$  than the one shown above?



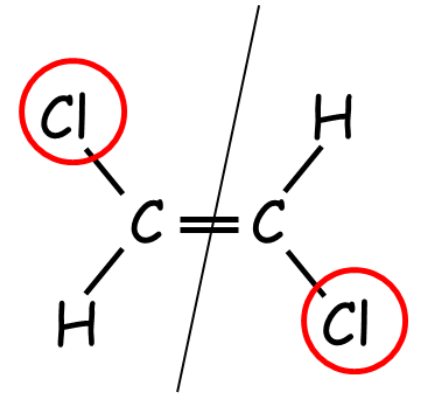
Q. The correct structure for 2,3,3-trimethylpentane is



Which of these compounds are *geometric isomers* possible?



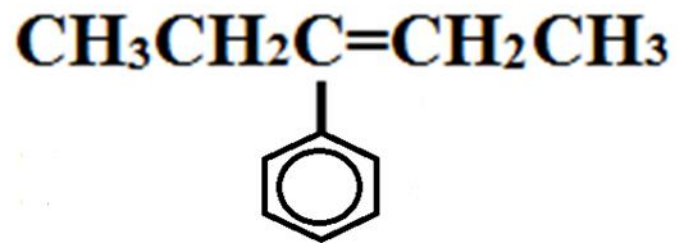
cis-dichloroethylene  
**Same side**



trans-dichloroethylene  
**Different sides**



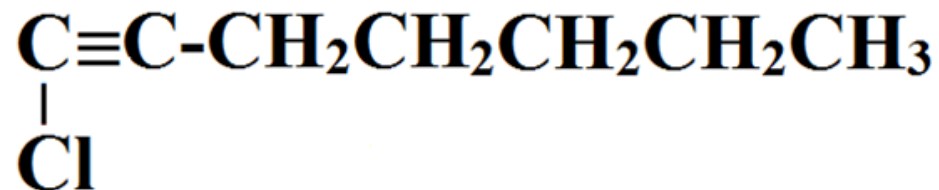
What is the IUPAC name for the compound shown below?



3-phenyl-2-pentene

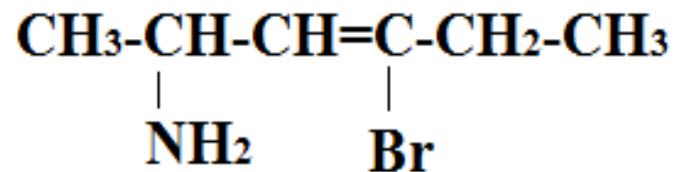


4-iodo-1-butyne



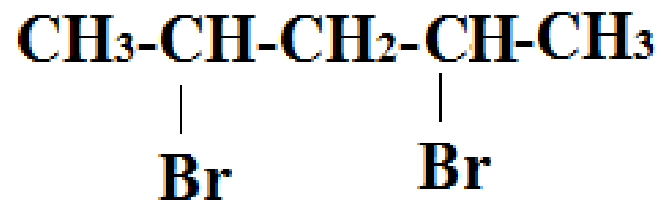
1-chloro-1-heptyne

Which of these is the systematic name for the compound represented below?



- A. 2-amino-4-bromo-3-hexene
- B. 5-amino-3-bromo-3-hexene
- C. 4-bromo-2-amino-3-hexene
- D. 5-amino-3-bromo-3-hexene

Which of these is the systematic name for the compound represented below?



A. 2,4-dibromopentane

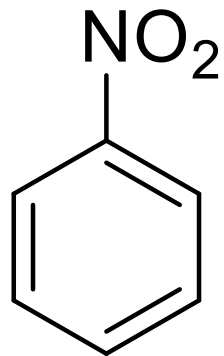
B. 2-bromo-4-bromopentane

C. 2,4-dibromhexane

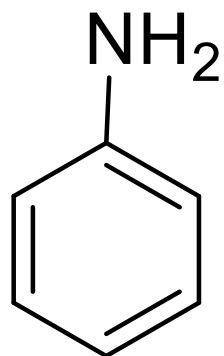
D. pentane2,4-dibromo

# Aromatic Hydrocarbons

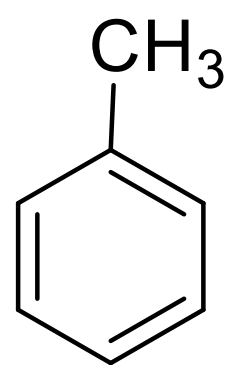
Write the name of the following compound



nitrobenzene

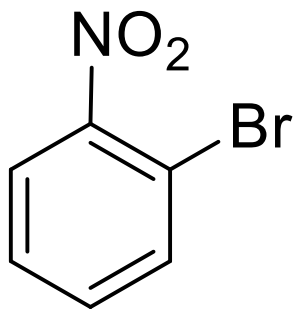


aminobenzene

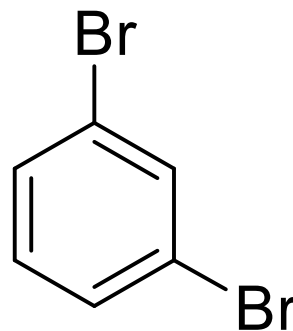


methylbenzene

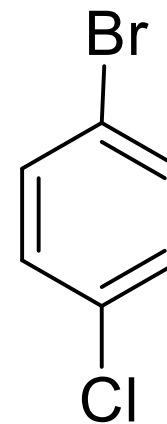
Write the name of the following compound



1,2 –bromonitrobenzene  
2 –bromonitrobenzene  
o –bromonitrobenzene



1,3 –dibromobenzene  
m –dibromobenzene



1,4 –bromochlorobenzene  
p –bromochlorobenzene  
4- bromochlorobenzene

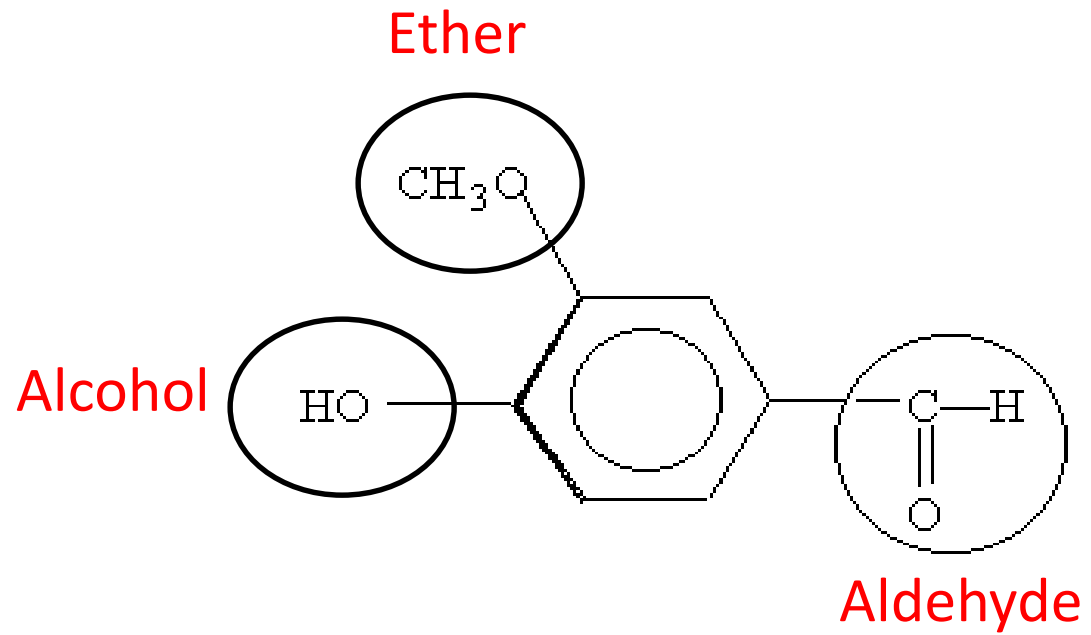
# Functional Groups

Compounds	Alcohols	Ethers	Aldehydes	Ketones	Carboxylic acids	Esters	Amines
Functional Group	hydroxyl -OH	Ether group -O-	carbonyl group C=O	carbonyl group C=O	carboxyl group -COOH	-COOR	-N- 
General formula	R-OH	R-O-R'	$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{H} \end{array}$	$\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{R} \end{array}$	RCOOH R = H or a hydrocarbon group	R'COOR R' = H or a hydrocarbon group	R <sub>3</sub> N R = H or a hydrocarbon group.
Example	Ethanol CH <sub>3</sub> CH <sub>2</sub> OH	Dimethyl ether CH <sub>3</sub> OCH <sub>3</sub>	Methanal $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{H} \end{array}$	Ethyl methyl ketone Or Butanone $\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3-\text{C}-\text{CH}_2\text{CH}_3 \end{array}$	Formic acid $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{OH} \end{array}$	Methyl ethanoate $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_3\text{C}-\text{C}-\text{O}-\text{CH}_3 \end{array}$	2-aminopropane $\begin{array}{c} \text{NH}_2 \\   \\ \text{CH}_3-\text{CH}-\text{CH}_3 \end{array}$

What is the functional group in the following compound

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$	$\text{—OH}$	Alcohol
$\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$	$\begin{array}{c} \text{O} \\ \parallel \\ \text{—C—H} \end{array}$	Aldehyde
$\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$	$\text{—NH}_2$	Amine
$\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_2\text{CH}_3$	$\begin{array}{c} \text{O} \\ \parallel \\ \text{—C—R} \end{array}$	Ketone
$\text{NH}_2\text{CH}_2\text{COOH}$	$\begin{array}{c} \text{O} \\ \parallel \\ \text{—C—OH} \end{array}$	Amino acid
$\text{CH}_3\text{CH}_2\text{CH}_2\text{CONH}_2$	$\begin{array}{c} \text{O} \\ \parallel \\ \text{—C—NH}_2 \end{array}$	Amide
$(\text{CH}_3)_3\text{N}$	$\text{R}_3\text{—N}$	Amine

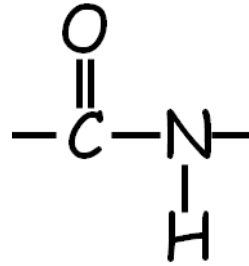
Determine the circled function group:





What is the functional group in protein

**Amide**



What is the functional group in the protein monomer?

**Amino acid**

