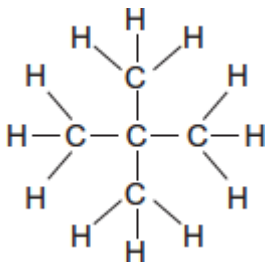


A S

ORGANIC

CHEMISTRY

Name this compound (IUPAC name required):



Your response

A S

ORGANIC

CHEMISTRY

2,2-dimethylpropane or dimethylpropane (it is clear that both methyl groups are on the second carbon atom as only 3 carbon atoms exist in the longest chain of propane).

Mark scheme

When asked to name a compound, spelling is key. Any spelling errors will result in a loss of marks.

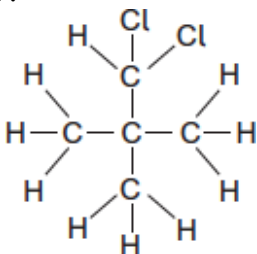
Comment

A S

ORGANIC

CHEMISTRY

Give all other position isomers that exist to this isomer:



Your response

A S

ORGANIC

CHEMISTRY

There is only one more position isomer which is 1,3-dichloro-2,2-dimethylpropane.

Mark scheme

When identifying the isomers that exist, always name them so that you don't come up with identical isomers.

Comment

A S

ORGANIC

CHEMISTRY

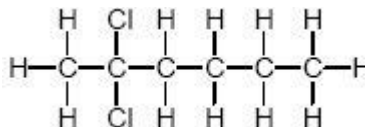
Draw the display formula of 2,2-dichlorohexane.

Your response

A S

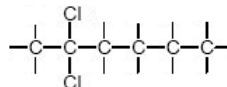
ORGANIC

CHEMISTRY



Mark scheme

When asked to draw a display formula, include all hydrogen atoms. Leaving 'sticks' is not acceptable.:



Comment

A S

ORGANIC

CHEMISTRY

Describe the essential features of the fractional distillation of crude oil that allow the fractions to be separated.

Your response

A S

ORGANIC

CHEMISTRY

HC fractions differ in their boiling points; boiling points depend on the chain length with longer chains having higher boiling points. Short chain hydrocarbons condense near the top of the tower where it is cooler.

Focus on the principles of fractional distillation rather than the physical features of the tower (e.g. bubble caps). These can be included if there are more than 4 marks available for the question.

Mark scheme

Comment

A S

ORGANIC

CHEMISTRY

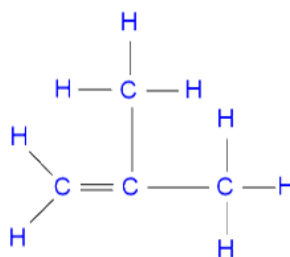
Draw the structure of a chain isomer of but-1-ene.

Your response

A S

ORGANIC

CHEMISTRY



Mark scheme

Comment

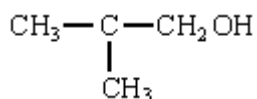
Chain isomer means that the carbon skeleton has changed. As but-1-ene is a straight chain molecule, a branch needed to be introduced.

A S

ORGANIC

CHEMISTRY

Name this molecule:



Your response

A S

ORGANIC

CHEMISTRY

2-methylpropan-1-ol

Mark scheme

Comment

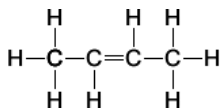
Remember that spelling counts when you are asked to give IUPAC names of molecules. 2-methylpropan-3-ol is a common mistake here.

A S

ORGANIC

CHEMISTRY

Draw the structure of a functional group isomer to this molecule:

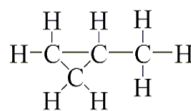


Your response

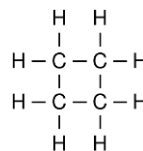
A S

ORGANIC

CHEMISTRY



Or



Only cyclic alkanes can have the same molecular formula as an alkene and therefore be functional group isomers. This type of question is asked fairly regularly in exams.

Mark scheme

Comment

A S

ORGANIC

CHEMISTRY

How many structural isomers of C_6H_{14} are there?

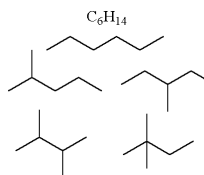
Your response

A S

ORGANIC

CHEMISTRY

5:



hexane; 2-methylpentane; 3-methylpentane; 2,3-dimethylbutane; 2,2-dimethylbutane

Remember that it is best to use a systematic approach (one branch first, then two branches etc.) and name each isomer to avoid mistakes.

Mark scheme

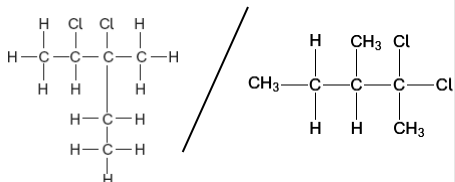
Comment

A S

ORGANIC

CHEMISTRY

What is the empirical formula?

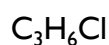


Your response

A S

ORGANIC

CHEMISTRY



Mark scheme

Comment

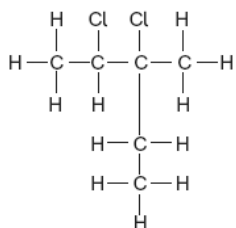
Be careful to read the question. A common mistake with this question is to state the molecular formula instead.

A S

ORGANIC

CHEMISTRY

Name this molecule:



Your response

A S

ORGANIC

CHEMISTRY

2,3-dichloro-3-methylpentane

Mark scheme

Comment

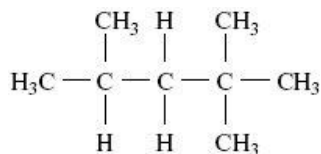
Spelling errors will be penalised when you are asked to name compounds. Common errors are to give incorrect numbers, to omit numbers or forget about the 'di' and to think the branch is an ethyl group.

A S

ORGANIC

CHEMISTRY

Name this molecule:



Your response

A S

ORGANIC

CHEMISTRY

2,2,4-trimethylpentane

Mark scheme

Comment

Spelling errors will be penalised when you are asked to name a molecule. Find the longest chain first, then identify the position of the branches. Keep numbers low (2,2,4, not 2,4,4); there are three branches so don't omit the 'tri'. Although there are 8 carbon atoms, the longest chain is a pentane, not octane.

A S

ORGANIC

CHEMISTRY

Give the names of the 5 fractions obtained by the fractional distillation of crude oil and list them in ascending order.

Your response

A S

ORGANIC

CHEMISTRY

Mineral oil (lubricating oil), gas oil (diesel), kerosene (paraffin), naphtha, petrol (gasoline)

Mark scheme

Comment

Make sure you learn the names and order of fractions off by heart.

A S

ORGANIC

CHEMISTRY

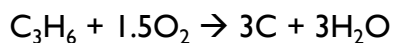
Write an equation to show propene burning in a limited supply of air to form a solid and water.

Your response

A S

ORGANIC

CHEMISTRY



Mark scheme

Comment

Make sure you read the question carefully. Usually, CO is formed during incomplete combustion, but CO is not a solid. Soot, C, is though.

A S

ORGANIC

CHEMISTRY

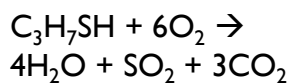
Write an equation to show how $\text{C}_3\text{H}_7\text{SH}$ completely combust to form water, carbon dioxide and sulfur dioxide.

Your response

A S

ORGANIC

CHEMISTRY



Mark scheme

Comment

The 8th H atom (bonded to the S atom) is easily overlooked here.

A

S

ORGANIC

CHEMISTRY

Write an equation to show how nitrogen monoxide is formed from nitrogen and oxygen.

Your response

A

S

ORGANIC

CHEMISTRY

$$\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$$
 or

$$\frac{1}{2} \text{N}_2 + \frac{1}{2} \text{O}_2 \rightarrow \text{NO}$$

Mark scheme

Comment

A

S

ORGANIC

CHEMISTRY

Write an equation to show how NO is removed by a catalytic converter.

Your response

A

S

ORGANIC

CHEMISTRY

$$2\text{CO} + 2\text{NO} \rightarrow 2\text{CO}_2 + \text{N}_2$$
 or

$$2\text{NO} \rightarrow \text{N}_2 + \text{O}_2$$
 or

$$\text{C} + 2\text{NO} \rightarrow \text{CO}_2 + \text{N}_2$$

Mark scheme

Don't make the mistake of producing NO₂. This is still a pollutant gas.

Comment

A S

ORGANIC

CHEMISTRY

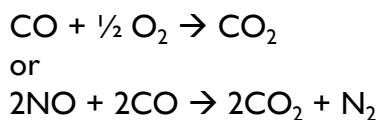
Write an equation to show how carbon monoxide is removed by a catalytic converter.

Your response

A S

ORGANIC

CHEMISTRY



Mark scheme

Comment

Common mistakes are to produce N, N₂O or NO₂ instead of N₂ in equation 2.

A S

ORGANIC

CHEMISTRY

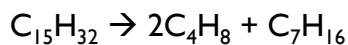
Write an equation to show how C₁₅H₃₂ is cracked into two C₄H₈ and a third molecule.

Your response

A S

ORGANIC

CHEMISTRY



Mark scheme

Comment

Make sure your equation is balanced and that you have produced alkane(s) AND alkene(s).

A S

ORGANIC

CHEMISTRY

Write equations to show how CH_2Cl_2 is formed from CH_3Cl and Cl_2 in the presence of UV light.

Your response

A S

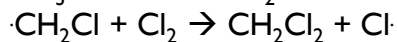
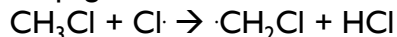
ORGANIC

CHEMISTRY

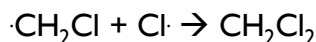
Initiation



Propagation



Termination



Mark scheme

Comment

A missing radical dot will be penalised once. As will a radical dot in the wrong place.

A S

ORGANIC

CHEMISTRY

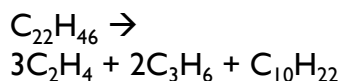
Write an equation to show how $\text{C}_{22}\text{H}_{46}$ is cracked into ethene and propene in a 3:2 ratio plus one other product.

Your response

A S

ORGANIC

CHEMISTRY



Mark scheme

Comment

Make sure your equation is balanced and that you have produced alkane(s) AND alkene(s).