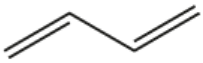
Hydrocarbons – 2021/20 GCE AS Chemistry A

1. Nov/2021/Paper_H032/01/No.18

The 'dienes' are a homologous series of non-cyclic compounds with two double bonds.

The simplest diene is shown below.



What is the general formula of the dienes homologous series?

A C_nH_{2n+2}

B C_nH_{2n}

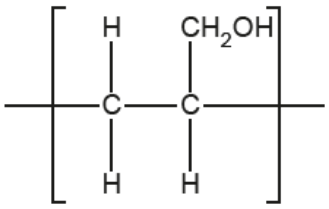
C C_nH_{2n-2}

D C_nH_{2n-4}

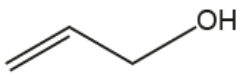
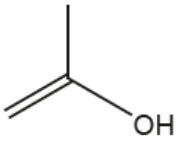
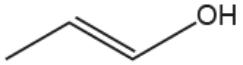
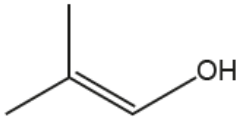
Your answer ☐ **[1]**

2. Nov/2021/Paper_H032/01/No.20

The repeat unit of an addition polymer is shown below.



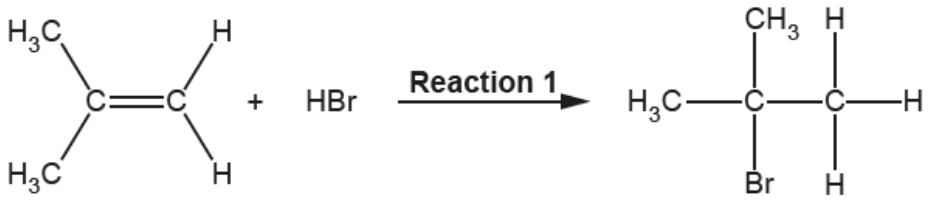
What is the monomer?

A	
B	
C	
D	

Your answer ☐ **[1]**

3. Nov/2021/Paper_H032/01/No.24(a, b)

A student reacts methylpropene with hydrogen bromide, HBr, as shown in **Reaction 1**.



Methylpropene **Compound A**

(a) Outline the reaction mechanism for **Reaction 1**.

The structures of methylpropene and compound **A** have been provided.

Include curly arrows and relevant dipoles.

name of mechanism ..... **[4]**

(b) When reacting methylpropene with HBr, a small amount of compound **B** also forms.

Compound **B** is a structural isomer of compound **A**.

(i) Explain the term **structural isomer**.

.....

.....

..... **[1]**

(ii) Show the structure for compound **B**.

[1]

4. Nov/2020/Paper_H032/01/No.15

Which property explains the low reactivity of alkanes?

A Electron pair repulsion between σ-bonds

B Free rotation about σ-bonds

C High C–C bond enthalpy

D High polarity of the C–H bonds

Your answer ☐ [1]

5. Nov/2020/Paper_H032/01/No.19

Which row describes a nucleophile?

A	electron pair donor	attracted to high electron density
B	electron pair donor	attracted to low electron density
C	electron pair acceptor	attracted to high electron density
D	electron pair acceptor	attracted to low electron density

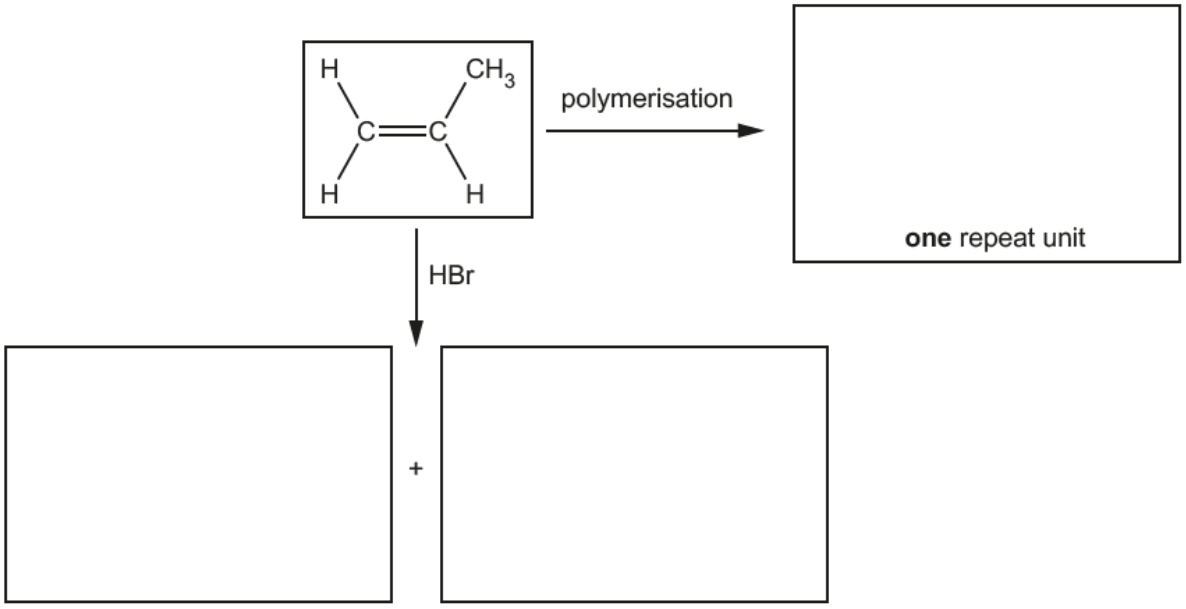
Your answer ☐ [1]

6. Nov/2020/Paper_H032/01/No.25

This question is about unsaturated hydrocarbons.

(a) Two reactions of propene are shown below.

In the boxes, show the structures of the organic products of the reactions.

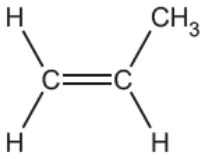


[3]

(b) Propene also reacts with bromine.

Outline the mechanism for the reaction of propene with bromine, Br_2.
The structure of propene has been provided.

Show curly arrows, relevant dipoles and product(s).



[4]

(c) The 'alkynes' is a homologous series of hydrocarbons.

The table shows three alkynes.

Alkyne	Structural formula	Molecular formula
ethyne	$HC{\equiv}CH$	C_2H_2
propyne	$CH_3C{\equiv}CH$	C_3H_4
but-1-yne	$CH_3CH_2C{\equiv}CH$	C_4H_6

(i) Explain what is meant by the term: **homologous series**.

.....

.....

..... **[2]**

(ii) Suggest the general formula of the alkynes.

..... **[1]**

(iii) Propyne reacts with bromine to form a saturated compound.

Write an equation for the reaction, showing the structure of the organic product.

[2]

(iv) But-1-yne is a structural isomer of C_4H_6.

Draw the structures of **2** other structural isomers of C_4H_6.

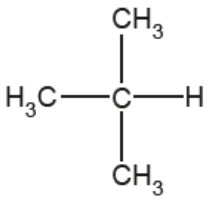
[2]

(v) Draw the structure of 2,5-dimethylhept-3-yne.

[1]

7. Nov/2021/Paper_H032/02/No.2

Alkane **A**, shown below, reacts with bromine in a radical substitution reaction.



Alkane A

(a) What is meant by a **radical**?

..... **[1]**

(b) Name the type of bond breaking that occurs in a radical substitution reaction.

..... **[1]**

(c) In this reaction with bromine, monosubstitution of alkane **A** forms a mixture of organic products.

Show the structures of **two** monosubstituted organic products that are formed.

[2]

(d) With excess bromine, further substitution takes place.

Write an equation for the reaction of alkane **A** with excess bromine to produce 1,3-dibromo-2-methylpropane.

Use structures for the organic compounds.

[2]