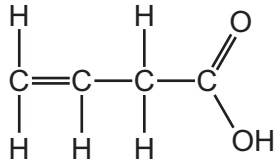
Paper 1

Questions are applicable for both core and extended candidates

1 Which formula represents an unsaturated hydrocarbon?

A C_3H_6 **B** C_3H_8 **C** C_4H_{10} **D** C_5H_{12}

2 The structure of an organic compound is shown.



The compound is tested separately with thymolphthalein and with aqueous bromine.

Which row describes the final colour observed for each test?

	thymolphthalein	aqueous bromine
A	blue	colourless
B	blue	orange
C	colourless	colourless
D	colourless	orange

3 Ethene is a hydrocarbon.

Which row shows the type of covalent bond between the carbon atoms in ethene and the effect of ethene on aqueous bromine?

	type of covalent bond	effect of ethene on aqueous bromine
A	single bond	colour changes from brown to colourless
B	single bond	colour changes from colourless to brown
C	double bond	colour changes from brown to colourless
D	double bond	colour changes from colourless to brown

4 Ethene and propene are both members of the same homologous series.

Which statements explain why ethene and propene have similar chemical properties?

1 They are both hydrocarbons.

2 They are both made by cracking.

3 They have the same functional group.

A 1 and 2 **B** 1 and 3 **C** 2 only **D** 3 only

5 A molecule of compound P contains two carbon atoms and four hydrogen atoms.

Which row represents P?

	name of compound	M_r	reacts with aqueous bromine
A	ethane	30	✗
B	ethene	16	✓
C	ethene	28	✓
D	ethene	28	✗

6 The equation representing the reaction of a hydrocarbon with water is shown.

$$C_xH_y + H_2O \xrightarrow{\text{catalyst}} C_xH_5OH$$

What are the values of x and y?

	x	y
A	1	4
B	1	6
C	2	4
D	2	6

7 A large hydrocarbon undergoes cracking.

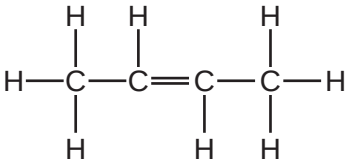
A smaller hydrocarbon, X, and a gas are the only two products.

Which row identifies hydrocarbon X and the gas?

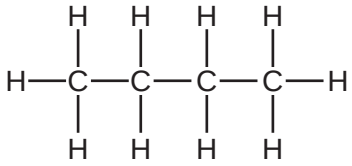
	hydrocarbon X	gas
A	saturated	carbon dioxide
B	saturated	hydrogen
C	unsaturated	carbon dioxide
D	unsaturated	hydrogen

8 The structures of two hydrocarbons, M and N, are shown.

M



N



Which statement is correct?

A M is an alkane and decolourises aqueous bromine.

B M is an alkene and decolourises aqueous bromine.

C N is an alkane and decolourises aqueous bromine.

D N is an alkene and decolourises aqueous bromine.

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

9 Which statements about the reaction of ethene with steam are correct? **(extended only)**

1 The product has a higher molecular mass than ethane.

2 The product reacts with aqueous bromine.

3 The number of electrons shared between carbon atoms decreases.

4 The reaction produces an alcohol and hydrogen.

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

10 What is the structural formula of the compound formed in the addition reaction of propene with bromine? **(extended only)**

A $CH_3CHBrCH_2Br$

B $CH_2BrCH_2CH_2Br$

C $CHBr_2CH_2CH_3$

D $CH_3CBr_2CH_3$

11 The structural formulae of two hydrocarbons are shown.

$CH_3CH_2CH_2CH_3$ $CH_3CH(CH_3)CH_3$

Which statement about the hydrocarbons is correct?

A They are both alkenes.

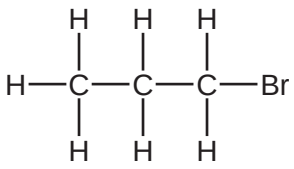
B They decolourise aqueous bromine.

C They are structural isomers.

D They undergo addition reactions.

12 What is the structure of the product of the reaction of propene with bromine? **(extended only)**

A



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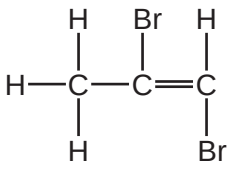

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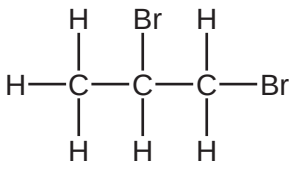

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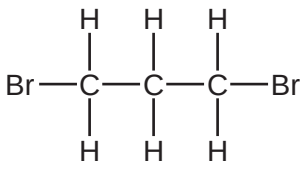
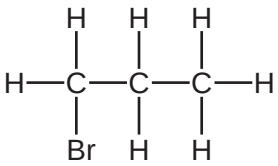


13 Propene, C_3H_6, reacts with bromine, Br_2, in an addition reaction.

Which structure represents the product of this reaction? **(extended only)**

A



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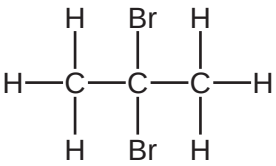

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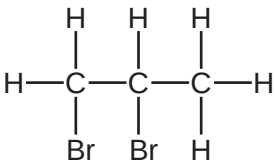
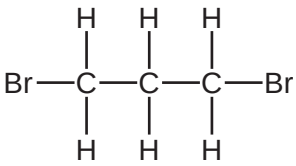


D



14 Some properties of colourless liquid L are listed.

- It boils at 65 °C.
- When added to water, two layers form which do not mix.
- It does not react with sodium carbonate.
- It has no effect on bromine water.

What is L?

A ethanol

B hexane

C hexene

D ethanoic acid

15 Ethene reacts with water under suitable conditions.

Which statement about this reaction is correct? **(extended only)**

A The product of this reaction has an M_r of 46.

B The reaction produces two different products.

C The reaction occurs when ethene gas is bubbled into cold water in the presence of an acid catalyst.

D The reaction is a redox reaction.