

Exercise of Chap 18 (Alkane&Alkene)

I MCQs

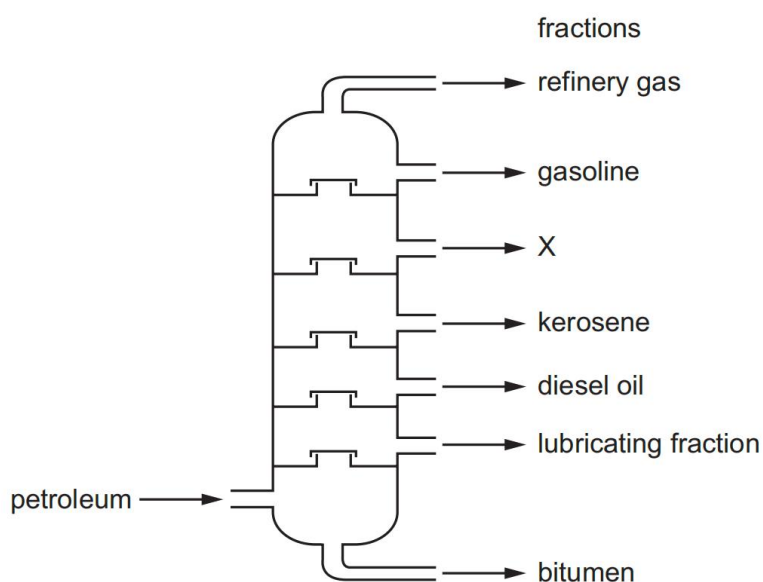
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

◆ Reflection

◆ Reflection

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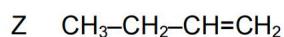
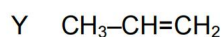
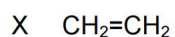
What is the name of fraction X?



- A** alcohol
B fuel oil
C naphtha
D paraffin

2

X, Y and Z are three hydrocarbons.



What do compounds X, Y and Z have in common?

- They are all alkenes.
- They are all part of the same homologous series.
- They all have the same boiling point.

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

3 Which reaction is **not** a reaction which alkenes undergo?

- A** bromination
- B** hydration/react with steam
- C** hydrogenation
- D** hydrolysis

4 In bright sunlight, ethane and chlorine combine in substitution reactions.
Which compound is **not** formed in these reactions?

- A** C_2H_3Cl **B** C_2H_5Cl **C** $C_2H_4Cl_2$ **D** HCl

5 Which products are obtained by the cracking of an alkane?

	alkene	hydrogen	water
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

6 Petroleum is an important raw material that is separated into useful products.
Which terms describe petroleum and the method used to separate it?

	description	separation method
A	compound	cracking
B	compound	fractional distillation
C	mixture	cracking
D	mixture	fractional distillation

◆ Reflection

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Which statements about propene are correct?

- 1 Propene contains only single bonds.
- 2 Propene decolourises bromine water.
- 3 Propene is obtained by cracking.
- 4 Propene is a hydrocarbon.

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

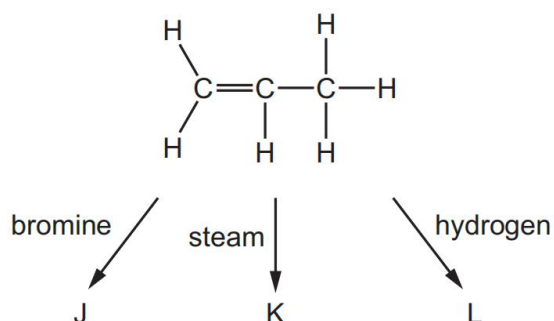
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Which compound rapidly decolourises aqueous bromine?

- A** propane
B propanoic acid
C propanol
D propene

9

Propene is an alkene that reacts with bromine, steam and hydrogen as shown.



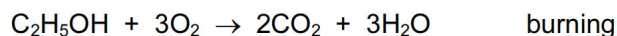
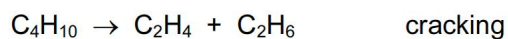
What are the products of these reactions?

	J	K	L
A	bromopropane	propanol	butane
B	dibromopropane	propanoic acid	propane
C	dibromopropane	propanol	propane
D	bromopropane	propanoic acid	butane

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Ethanol is a fuel used in cars. It can be made from petroleum.



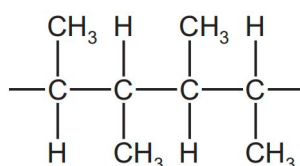
Compounds of how many homologous series appear in these equations?

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

◆ Reflection

1
1

The partial structure of addition polymer X is shown.



Which monomer is used to form polymer X?

- A** $\text{CH}_2=\text{CH}_2$
B $\text{CH}_3\text{CH}=\text{CH}_2$
C $\text{CH}_3\text{CH}=\text{CHCH}_3$
D $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$

1
2

In which row are the monomer and polymer chain correctly matched?

	monomer	part of the polymer chain
A	$\text{CH}_3\text{CH}=\text{CHCH}_3$	$-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)-$
B	$\text{CH}_2=\text{CHCl}$	$-\text{CHCl}-\text{CHCl}-\text{CHCl}-\text{CHCl}-$
C	$\text{CH}_3\text{CH}=\text{CH}_2$	$-\text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_3-\text{CH}-\text{CH}_2-$
D	$\text{CH}_2=\text{CHCH}_2\text{CH}_3$	$-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}(\text{CH}_2\text{CH}_3)-$

II	Structured questions	<div style="text-align: right; color: red;">◆ Reflection</div> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
1	<p>Two homologous series of hydrocarbons are the alkanes and the alkenes.</p> <p>(i) One general characteristic of a homologous series is that the physical properties vary in a predictable way.</p> <p>State three other general characteristics of a homologous series.</p> <p>.....</p> <p>.....</p> <p>..... [3]</p> <p>The fractional distillation of crude oil usually produces large quantities of the heavier fractions. The market demand is for the lighter fractions and for the more reactive alkenes. The heavier fractions are cracked to form smaller alkanes and alkenes as in the following example.</p> $\begin{array}{ccc} \text{C}_8\text{H}_{18} & \longrightarrow & \text{C}_4\text{H}_{10} + \text{C}_4\text{H}_8 \\ \text{octane} & & \text{butane} \quad \text{butenes} \end{array}$ <p>(a) (i) Write a different equation for the cracking of octane.</p> $\text{C}_8\text{H}_{18} \longrightarrow \dots\dots\dots + \dots\dots\dots \quad [1]$ <p>(ii) The cracking of octane can produce isomers with the molecular formula C₄H₈. Draw the structural formulae of two of these isomers.</p> <p style="text-align: right;">[2]</p>	

(c) Alkenes are more reactive than alkanes and are used to make a range of organic chemicals. Propene, $\text{CH}_3\text{-CH=CH}_2$, is made by cracking. Give the structural formula of the addition product when propene reacts with the following.

(i) water

[1]

(ii) bromine

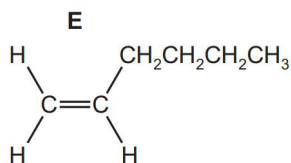
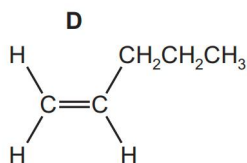
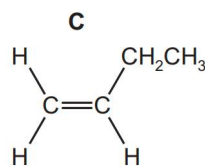
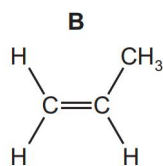
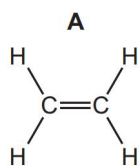
[1]

(iii) Deduce the structural formula of the product formed when propene reacts with hydrogen chloride.

[1]

◆ Reflection

The structures of five alkenes, **A**, **B**, **C**, **D** and **E**, are shown.



(a) What is the general formula of alkenes?

..... [1]

(b) What is the molecular formula of alkene **D**?

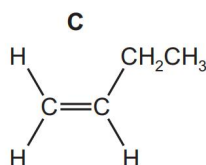
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(c) Predict which alkene, **A**, **B**, **C**, **D** or **E**, has the highest boiling point.
Explain your answer.

alkene

explanation

(e) A student added aqueous bromine to alkene **C**.



Describe the colour change seen and draw the structure of the product. Show all of the atoms and all of the bonds.

colour change from to

structure

[2]

(ii) State the reagent and conditions needed to produce an alcohol from alkene **B**.

reagent

conditions

.....

[3]

◆ Reflection