

Chem!stry

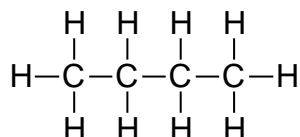
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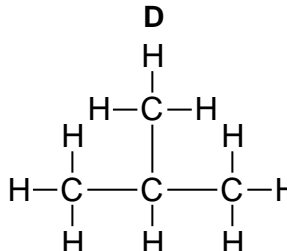
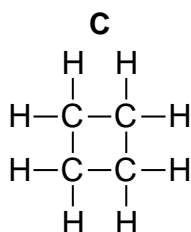
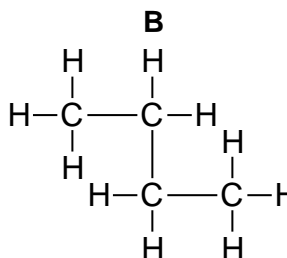
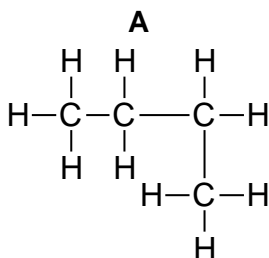
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Assignment on Alkanes and Alkenes

1. The structure of butane may be represented as:



Which one of the following is an isomer of butane?



2. Which one of the following is the formula of an alkene?

A CH₄

B C₂H₄

C C₃H₈

D C₄H₁₀

3. Which one of the following reagents is best suited to distinguishing between samples of ethane and ethene?

A A lighted splint.

B Aqueous bromine.

C Aqueous barium nitrate.

D Lime water.

4. What is the number of isomers of formula C₅H₁₂?

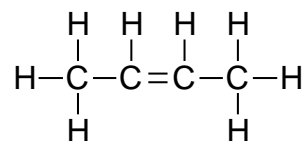
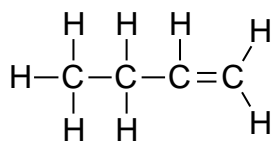
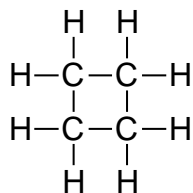
A 1

B 2

C 3

D 4

10. The diagram shows the structural formulae of three compounds:



Which statement is correct for all three compounds?

- A They decolourise aqueous bromine.
- B They are carbohydrates.
- C They belong to the same homologous series.
- D They are isomers of one another.

11. The table shows how many moles of products are formed by the complete combustion of four hydrocarbons. Which hydrocarbon requires 11 moles of oxygen gas (O_2) for this combustion?

	Hydrocarbon	Moles of CO_2	Moles of H_2O
A	C_3H_8	3	4
B	C_5H_{12}	5	6
C	C_6H_{12}	6	6
D	C_7H_{16}	7	8

12. Which statements are true about alkanes?

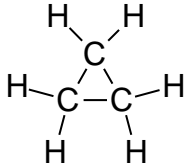
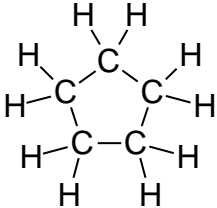
- 1 Their general formula is C_nH_{2n} .
- 2 They are flammable.
- 3 They react with chlorine.

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

• Write your answers to the multiple choice questions in the table provided below.

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

13. Study the homologous series of cyclic alkanes given in the table below.

Name	Molecular Formula	Structural Formula
	C_3H_6	
Cyclobutane	C_4H_8	
Cyclopentane		

- a) Name the three carbon cycloalkane.
- b) Give the structural formula of the four carbon cycloalkane.
- c) Give the molecular formula of the five carbon cycloalkane.
- d) Give the general formula for the homologous series of cycloalkanes.

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- e) Cyclobutane undergoes complete combustion to form carbon dioxide and water. Write the balanced chemical equation for the complete combustion of cyclobutane.

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14. Crude oil is a complex mixture of organic compounds. Crude oil can be separated into useful chemicals by the process of fractional distillation.

- a) i) Name the fraction with the highest boiling point. State one use for this fraction.

.....

- ii) State the fraction with the lowest boiling point. State one use for this fraction.

.....

- b) Briefly explain why long-chain alkanes are “cracked”.

.....

- c) i) Give the formula for the alkane with 20 carbon atoms.

.....

- ii) The 20 carbon alkane was cracked to form a 12 carbon alkane and an 8 carbon alkene. Write a balanced chemical equation for this reaction.

.....

15. Bromine water can be used to test for the presence of an alkene.

- a) i) Describe what change you would see take place when bromine water is added to propene.

.....

- ii) Give the structural formula and name of the product that is formed when bromine water is added to propene.

b) Propane will also react with bromine, but under different conditions.

- i) State the conditions under which propane reacts with bromine. What type of reaction is this?

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- ii) Give the structural formula and name of a possible organic product that could be formed when 1 mol of propane reacts with 1 mol of bromine.

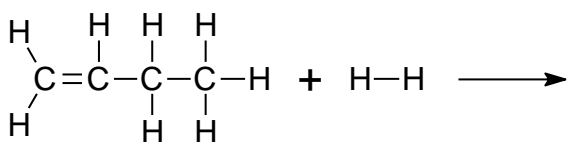
16. An alkene, **X**, was found to have the following percentage composition by mass:

$$\text{C} = 85.7\%$$

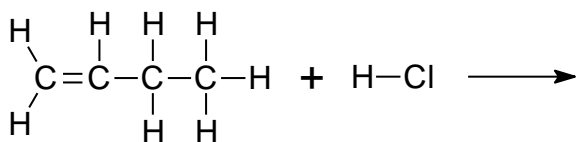
$$\text{H} = 14.3\%$$

- a) Calculate the empirical formula of **X**.
- b) The relative molecular mass of **X** is 70.0. Calculate the molecular formula of **X**.
- c) Draw and name all of the possible structural formulae that **X** could have.

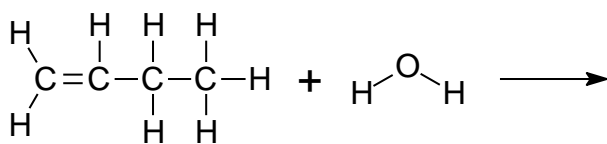
17. Alkenes undergo addition reactions. Complete the table below to show the reactions of butene with hydrogen, hydrogen chloride and water.



Name:



Name:



Name:

- Scan the QR code given below to view the answers to this assignment.



http://www.chemist.sg/organic_chem/assignments/alkanes_alkenes_ans.pdf