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# CHEMISTRY

## ORGANIC CHEMISTRY

Level & Board	AQA (A-LEVEL)
TOPIC:	INTRODUCTION TO ORGANIC CHEMISTRY
PAPER TYPE:	QUESTION PAPER - 1
TOTAL QUESTIONS	10
TOTAL MARKS	33

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## Introduction to Organic Chemistry - 1

1. 2-bromo-2-methylpentane is heated with potassium hydroxide dissolved in ethanol. Two structural isomers are formed.

(a) State the meaning of the term structural isomers.

(1)

(b) Name and draw the mechanism for the formation of one of the isomers.

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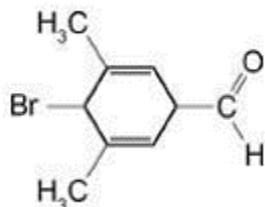
(5)

2. Which can be both an empirical and molecular formula of a stable compound?

- A.  $\text{CH}_2\text{O}$   
B.  $\text{P}_4\text{O}_{10}$   
C.  $\text{NH}_2$   
D.  $\text{CH}_3$

(1)

3. Which statement is correct about the molecule shown?



- A. It reacts with HBr in an electrophilic substitution reaction.
- B. It reacts with NaBH<sub>4</sub> in a nucleophilic addition-elimination reaction.
- C. It reacts with ethanolic KOH in an elimination reaction.
- D. It reacts with KCN in a nucleophilic substitution reaction.

(1)

4. Compound J, known as leaf alcohol, has the structural formula CH<sub>3</sub>CH<sub>2</sub>CH=CHCH<sub>2</sub>CH<sub>2</sub>OH and is produced in small quantities by many green plants.

The E isomer of J is responsible for the smell of freshly cut grass.

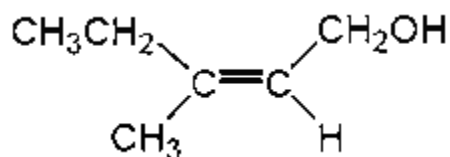
(a) Give the structure of the E isomer of J.

(1)

(b) Give the skeletal formula of the organic product formed when J is dehydrated using concentrated sulfuric acid.

(1)

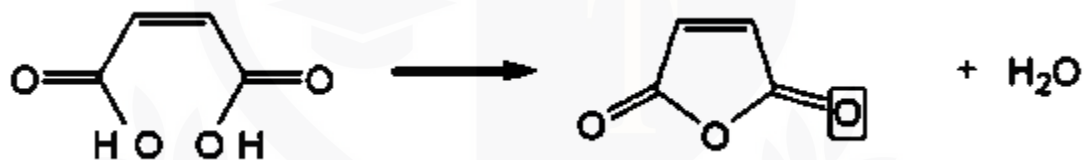
(c) Another structural isomer of J is shown below.



Explain how the Cahn-Ingold-Prelog (CIP) priority rules can be used to deduce the full IUPAC name of this compound.

(6)

(d) The effect of gentle heat on maleic acid is shown below.



A student predicted that the yield of this reaction would be greater than 80%.

In an experiment 10.0 g of maleic acid were heated and 6.53 g of organic product were obtained.

Is the student correct?

Justify your answer with a calculation using these data.

(2)

5. Which compound is a structural isomer of Z-but-2-ene?

- A. butane
- B. E-but-2-ene
- C. cyclobutane
- D. methylbut-2-ene

(1)

6. This question is about the structures of some organic molecules.

(a) Draw the skeletal formula of 3-methylbutanal.

(1)

(b) Draw the displayed formula of  $C_5H_{11}Br$  that is the major product of the reaction of 2-methylbut-2-ene with hydrogen bromide.

(1)

(c) Thermal cracking of hydrocarbons produces molecules that are attacked by electrophiles because they have a region of high electron density.  
Draw the structure of one of these molecules that contains four carbon atoms.

(1)

7. How many structural isomers are there with the molecular formula  $C_3H_6BrCl$ ?

- A. 4
- B. 5
- C. 6
- D. 7

(1)

8. Explain the differences between structural isomerism and stereoisomerism.

Use examples to show how compounds with the molecular formula  $C_4H_8$  exhibit stereoisomerism and the three types of structural isomerism.

(6)

9. Which compound does not show stereoisomerism?

- A. 1,2-dichloropropene
- B. 1,2-dichloropropane
- C. 1,3-dichloropropene
- D. 1,3-dichloropropane

(1)

10. Some oil-fired heaters use paraffin as a fuel.

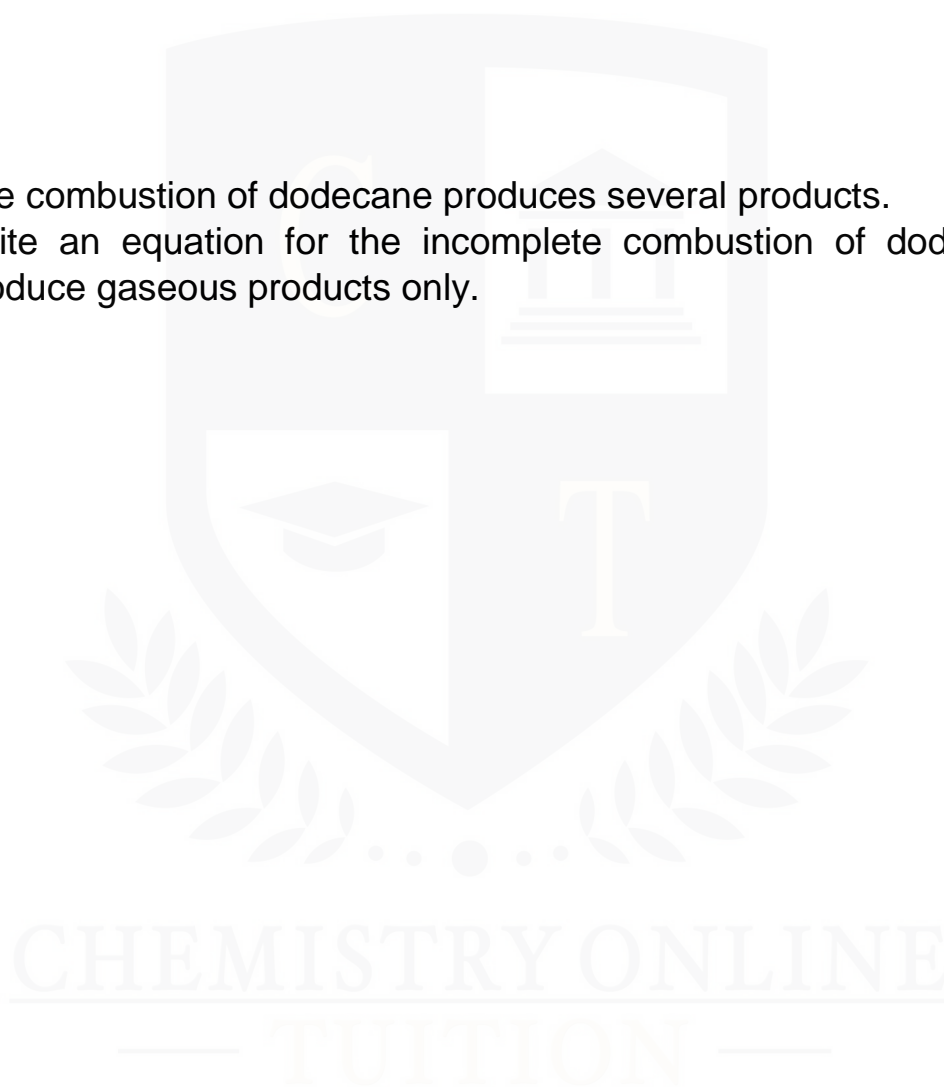
One of the compounds in paraffin is the straight-chain alkane, dodecane ( $C_{12}H_{26}$ ).

**(a)** Give the name of the substance from which paraffin is obtained. State the name of the process used to obtain paraffin from this substance.

**(2)**

**(b)** The combustion of dodecane produces several products. Write an equation for the incomplete combustion of dodecane to produce gaseous products only.

**(1)**



I am Sorry !!!!!



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