



CHEMISTRY ONLINE
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CHEMISTRY

ORGANIC CHEMISTRY

Level & Board	AQA (A-LEVEL)
TOPIC:	ALKANES
PAPER TYPE:	QUESTION PAPER - 4
TOTAL QUESTIONS	10
TOTAL MARKS	39

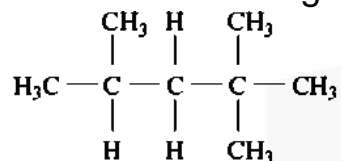
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Alkanes - 4

1. The molecular formula C_8H_{18} represents several structural isomers.

State what is meant by the term structural isomers.

Name the following structural isomer of C_8H_{18}



(3)

2. Which one of the following reactions involves nucleophilic addition?

- A. $\text{CH}_3\text{CH}=\text{CH}_2 + \text{HBr} \rightarrow \text{CH}_3\text{CHBrCH}_3$
 B. $\text{CH}_3\text{CH}_2\text{CH}_3 + \text{Cl}_2 \rightarrow \text{CH}_3\text{CHClCH}_3 + \text{HCl}$
 C. $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{NaOH} \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{NaBr}$
 D. $\text{CH}_3\text{CH}_2\text{CHO} + \text{HCN} \rightarrow \text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CN}$

(1)

3. When petrol is burned in an internal combustion engine, some nitrogen monoxide, NO, is formed.

This pollutant is removed from the exhaust gases by means of a reaction in a catalytic converter.

- (a) Write an equation for the reaction between nitrogen and oxygen to form nitrogen monoxide.

(1)

(b) Identify a catalyst used in a catalytic converter.

(2)

(c) Write an equation to show how nitrogen monoxide is removed from the exhaust gases as they pass through a catalytic converter.

(2)

4. Carbon monoxide, CO, is formed during the incomplete combustion of octane.

(a) Write an equation for the incomplete combustion of octane, forming carbon monoxide and water.

(1)

(b) Why does incomplete combustion sometimes take place?

(1)

5. Petrol is obtained, not only by fractional distillation of crude oil, but also by cracking of hydrocarbons from heavy fractions.

State why hydrocarbons from heavy fractions are cracked and explain why these hydrocarbons are less easy to ignite than those in petrol.

(4)

6. Chloromethane can react with ammonia to produce a primary amine.

(a) What feature of the chloromethane molecule makes it susceptible to attack by an ammonia molecule?

(2)

(b) Name the amine produced in this reaction.

(2)

(c) Outline a mechanism for this reaction.

(3)

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7. Ethanethiol (C_2H_5SH), a compound with an unpleasant smell, is added to gas to enable leaks from gas pipes to be more easily detected.

(a) Write an equation for the combustion of ethanethiol to form carbon dioxide, water and sulfur dioxide.

(1)

(b) Identify a compound that is used to react with the sulfur dioxide in the products of combustion before they enter the atmosphere.

(2)

(c) Give one reason why this compound reacts with sulfur dioxide.

(1)

(d) Ethanethiol and ethanol molecules have similar shapes. Explain why ethanol has the higher boiling point.

(2)

8. Explain the essential features of the fractional distillation of crude oil that enable the crude oil to be separated into fractions.

(4)

9. Name a catalyst used in catalytic cracking.

State the type of mechanism involved and outline the industrial conditions used in the process.

(4)

10. Ethanol was the fuel used in the first mass-produced car, the Model T Ford.

(a) Write an equation which shows how ethanol burns completely in air to form carbon dioxide and water as the only products.

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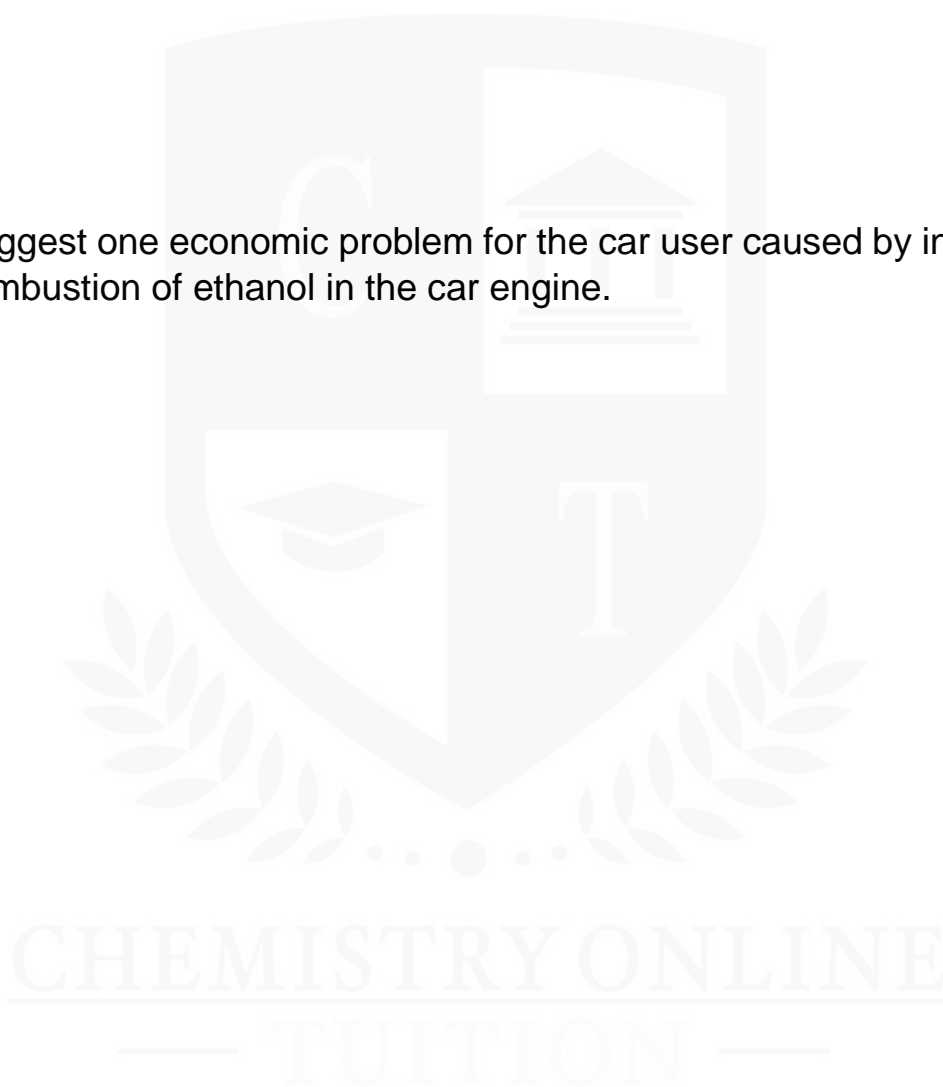
(1)

(b) Suggest one environmental problem caused by incomplete combustion of ethanol in a car engine.

(1)

(c) Suggest one economic problem for the car user caused by incomplete combustion of ethanol in the car engine.

(1)



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- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
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