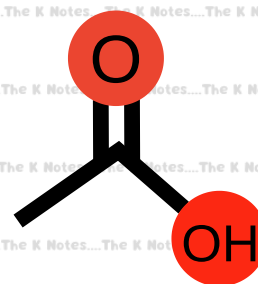
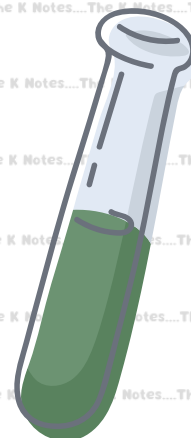
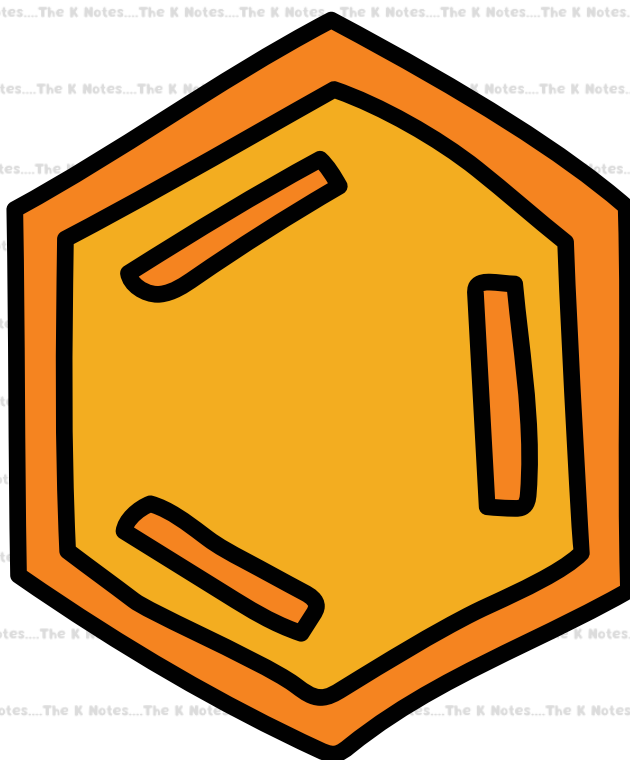
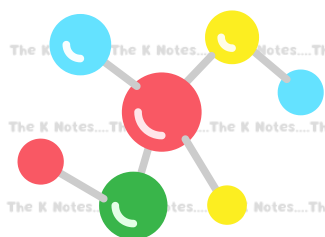


K Revision

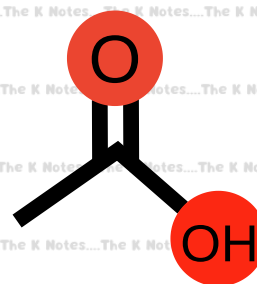
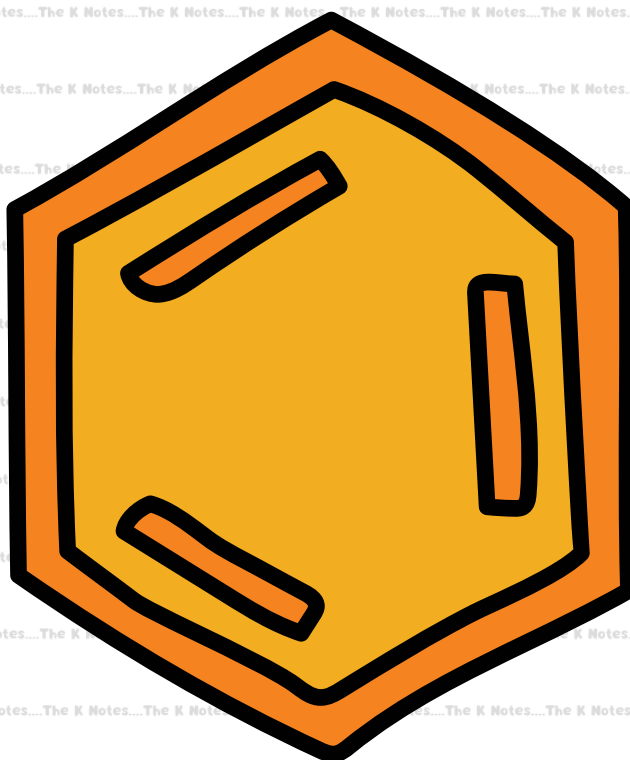
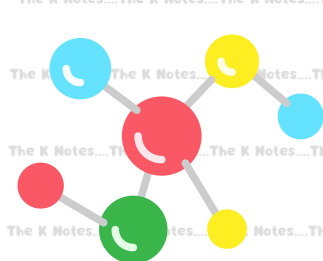
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K Revision

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DAY 1 FUELS PART 1

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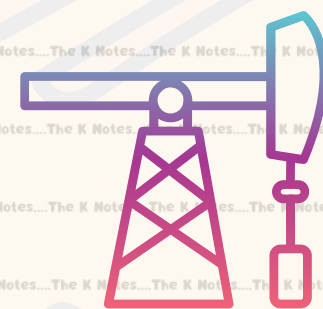
Day 1 Fuels Part 1

Petroleum is a mixture of different hydrocarbons.

Which process is used to separate the petroleum into groups of similar hydrocarbons?

- A combustion
- B fractional distillation**
- C reduction

The Fractional distillation breaks down Petroleum into different Fractions , each fraction has multiple compounds inside it.



Underground

drilling



Black liquid called Petroleum



Fractional Distillation

Petroleum Different Fractions

The 60-Day IGCSE Organic Chemistry Challenge

Day 1 Fuels Part 1

Fast Quiz

Question 1

Petroleum is a mixture of different hydrocarbons . Which process is used to separate the petroleum into groups of similar hydrocarbons ?

COMBUSTION

REDUCTION

FRACTIONAL
DISTILLATION

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Day 1 Fuels Part 1

Answer

Question 1

Petroleum is a mixture of different hydrocarbons . Which process is used to separate the petroleum into groups of similar hydrocarbons ?

COMBUSTION

REDUCTION

**FRACTIONAL
DISTILLATION**

The Fractional distillation breaks down Petroleum into different Fractions , each fraction has multiple compounds inside it.

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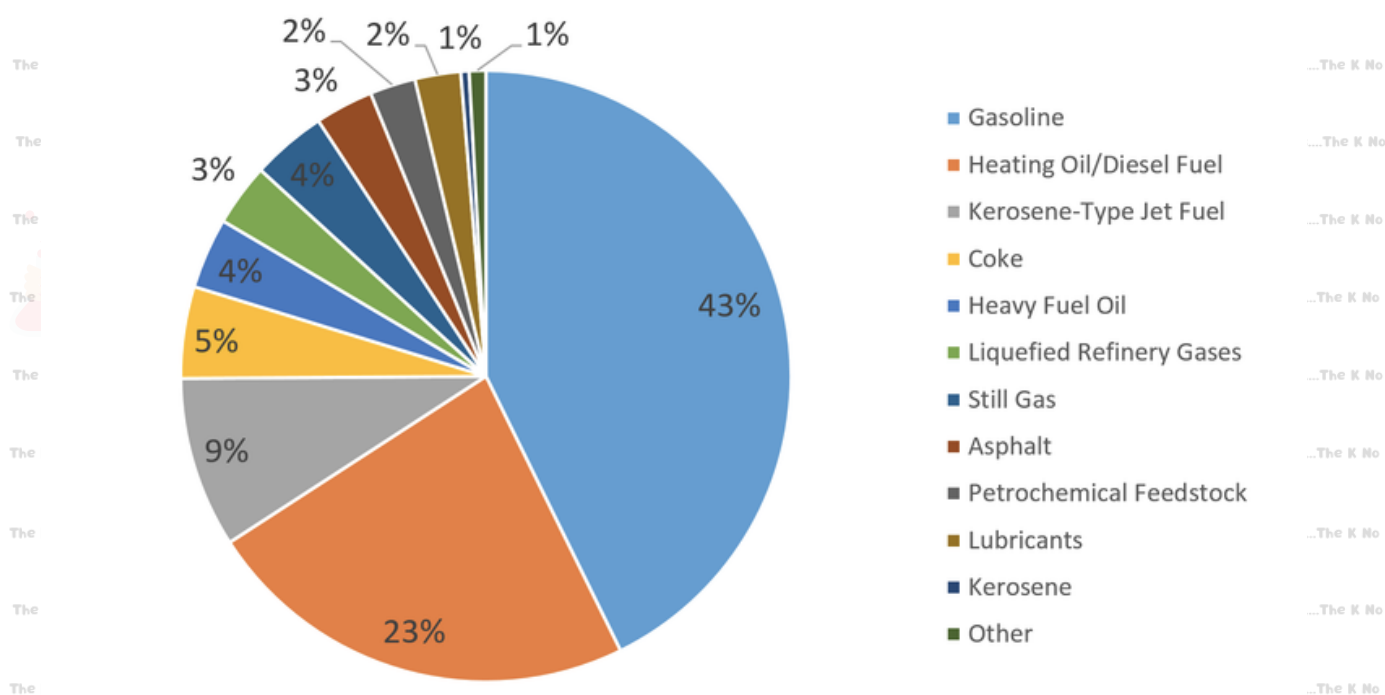
Day 1 Fuels Part 1

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	reduction
B	compound	fractional distillation
C	mixture	reduction
D	mixture	fractional distillation

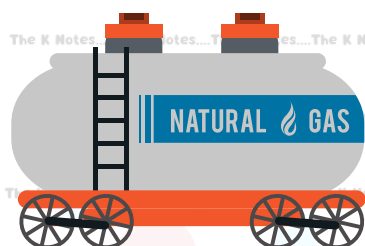
The Fractions of Petroleum are mixed together. They form a mixture not a compound, that is why this mixture can be separated into its components by Physical means (Fractional distillation) not by chemical reactions.



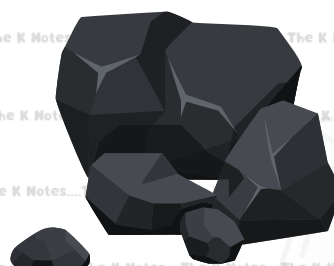
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Day 1 Fuels Part 1

We can get a lot of our Fuels used daily from underground or from the sea , three examples of these Fuels are called Fossil Fuels :



Natural Gas



Coal



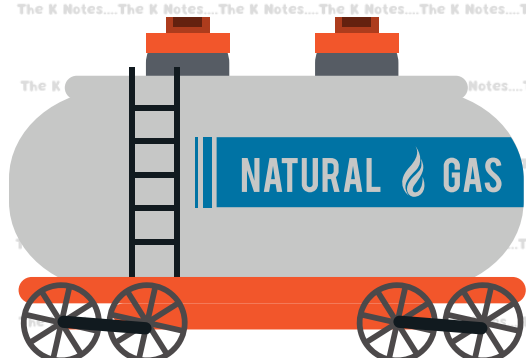
Petroleum

Examples of Fossil Fuels

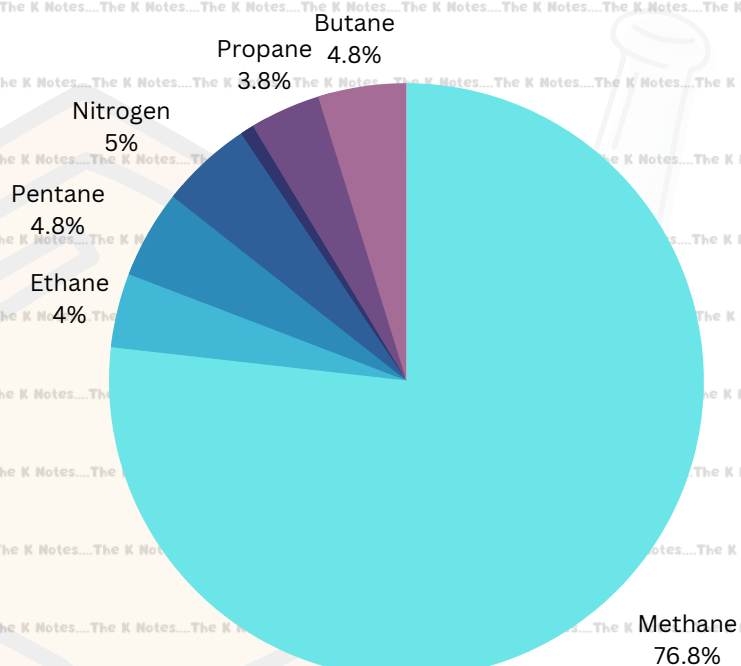
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Day 1 Fuels Part 1

Natural Gas is mainly composed of Methane Gas



Natural Gas



Composition of Natural Gas

Do not study or memorize numbers

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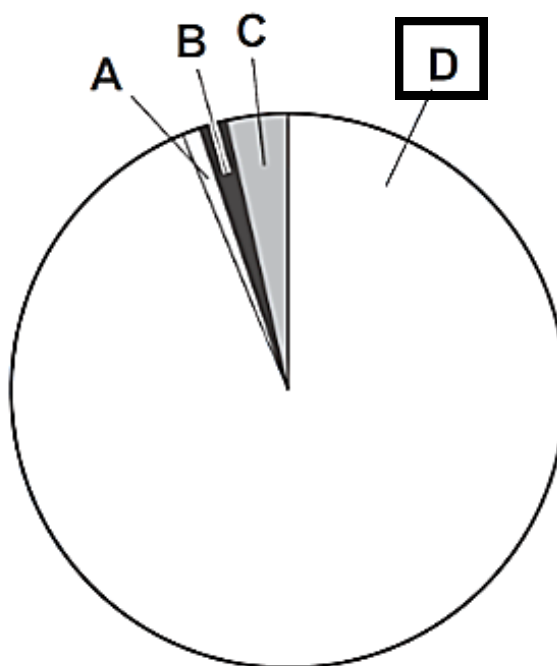
Day 1 Fuels Part 1

What is the main constituent of natural gas?

- A hydrogen
- B carbon monoxide
- C methane**
- D nitrogen

The pie chart represents the composition of natural gas.

Which sector represents methane?



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Day 1 Fuels Part 1

Which statement is correct?

- A Coal, natural gas and oxygen are all fuels.
- B Hydrogen is the main constituent of natural gas.
- C Petroleum is separated into useful substances by fractional distillation.**

In this Previous question it is your task to know the reason why Options A and B are not correct if you are not able to answer refer back to the previous pages

Note that oxygen is the element that helps in combustion of fuels but is not a fuel itself



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Day 1 Fuels Part 1

Question

Question 2

Which of the following is not considered as a fuel ?

PETROLEUM

OXYGEN

COAL

NATURAL
GAS

The 60-Day IGCSE Organic Chemistry Challenge

Day 1 Fuels Part 1

Answer

Question 2

Which of the following is not considered as a fuel ?

PETROLEUM

OXYGEN

COAL

NATURAL
GAS

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Day 1 Fuels Part 1

Let's Summarize what we took until now

Fuels

Natural Gas. - Petroleum. - Coal.

Mainly from Methane
Separated into its components
by Fractional Distillation

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Day 1 Fuels Part 1

Petroleum is separated by fractional distillation.

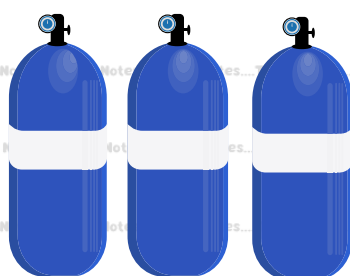
Which statement about the fractions produced is correct?

- A Bottled gas for heating and cooking is obtained from the naphtha fraction.
- B Diesel oil is used as a fuel for jet aircraft.
- C Substances used to make polishes are obtained from the lubricating fraction.
- D The kerosene fraction contains many useful waxes.

This is how questions about Fractions come in the exam, you may not know yet how to answer such questions but you will soon once we start by examining the first Fraction that comes out from the Fractional distillation of the Petroleum

Refinery Gases

Is the name of the first Fraction we will discuss Made of mixture of Organic compounds, these gases are used for cooking heating and other applications, they include propane butane ethane and also methane



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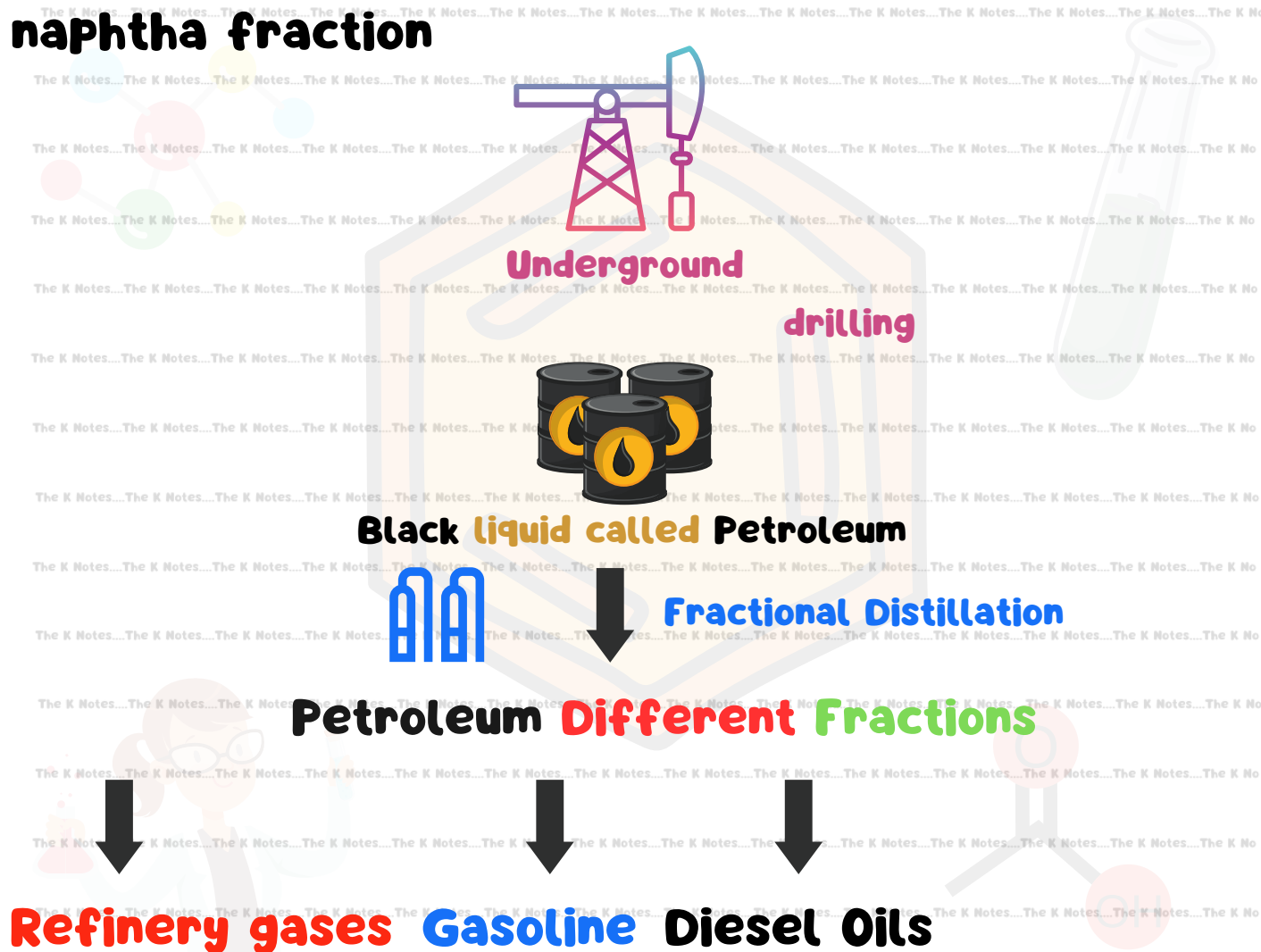
Day 1 Fuels Part 1

Petroleum is separated by fractional distillation.

Which statement about the fractions produced is correct?

A Bottled gas for heating and cooking is obtained from the naphtha fraction.

We know now very well this option was wrong as the fraction should be Refinery gases not naphtha fraction



Gasoline Diesel Oils are very famous other Fractions used as fuel for Vehicles

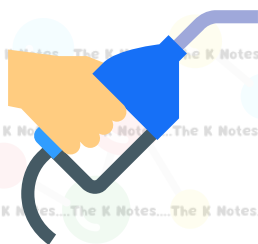
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Day 1 Fuels Part 1

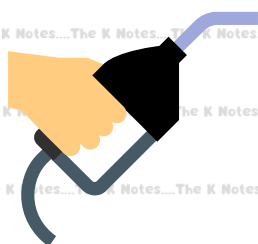
While Gasoline is used for Cars and small

vehicles Diesel Oils is used for Trucks

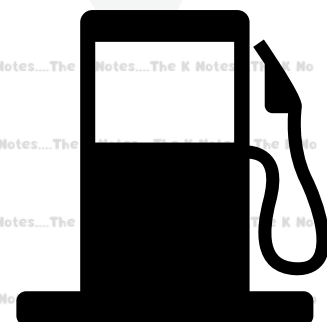
and lorries and other bigger vehicles equipped with a special engines called Diesel engines



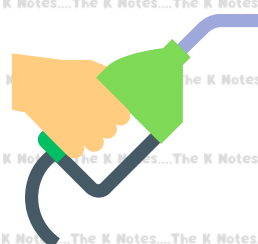
Gasoline



Diesel oils



Planes and jets can not use the same fuels so use ones obtained from a different fraction known as Kerosene (paraffin is another name)



Kerosene



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Day 1 Fuels Part 1

Fast Quiz

Question 3

Match the following Petroleum Fractions with their uses

KEROSENE

CARS FUEL

REFINERY
GASES

DIESEL
ENGINES

GASOLINE

COOKING

DIESEL OIL

JET FUEL

The 60-Day IGCSE Organic Chemistry Challenge

Day 1 Fuels Part 1

Answer

Question 3

Match the following Petroleum Fractions with their uses

KEROSENE

JET FUEL

REFINERY
GASES

COOKING

GASOLINE

CARS FUEL

DIESEL OIL

DIESEL
ENGINES

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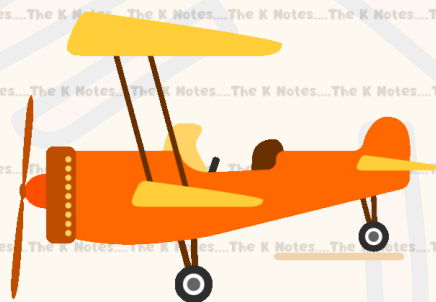
Day 1 Fuels Part 1

Petroleum is separated by fractional distillation.

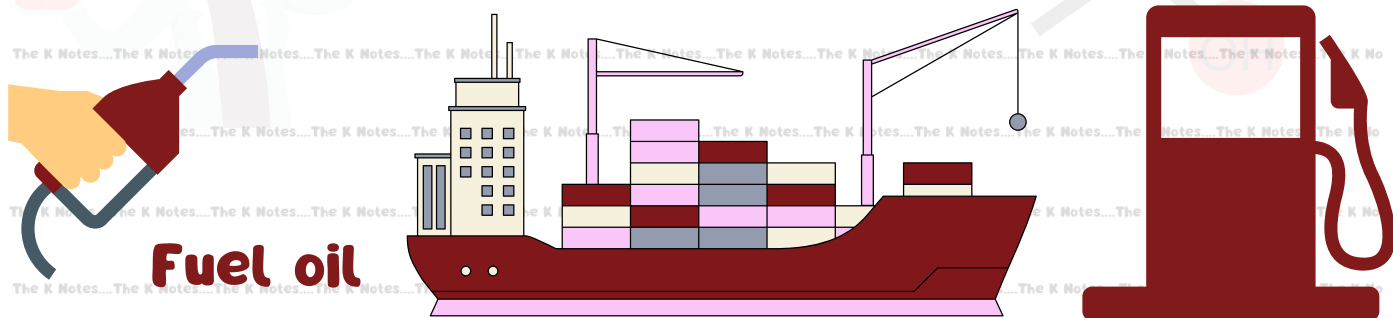
Which statement about the fractions produced is correct?

- A Bottled gas for heating and cooking is obtained from the naphtha fraction.
- B Diesel oil is used as a fuel for jet aircraft.

We are also good enough now to know that Diesel oil is used for Diesel engines , while jet aircraft use kerosene only (paraffin).



But what about ships and other heating systems and industrial processes , they will need fuel from another fraction called Fuel Oil

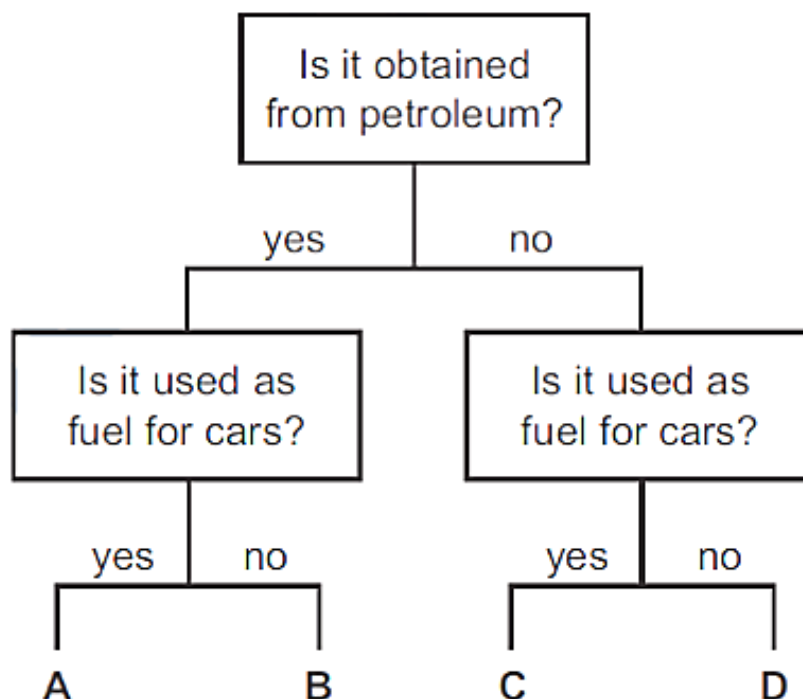


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Day 1 Fuels Part 1

Now a small question to test your understanding

Which fuel could be gasoline?



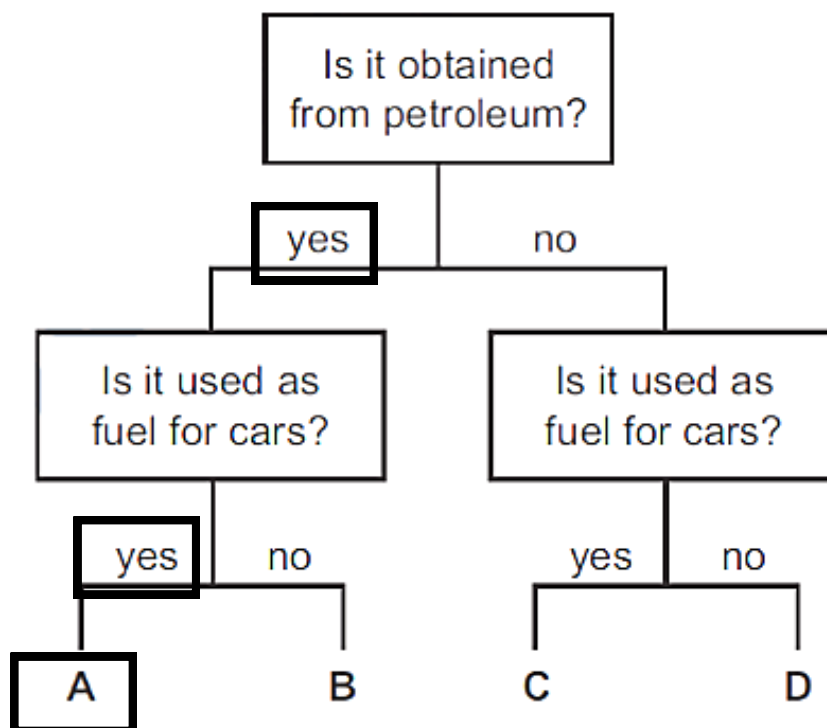
The Answer is in the next page.

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Day 1 Fuels Part 1

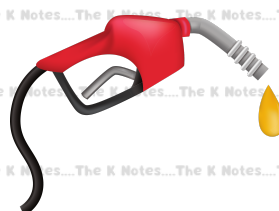
Answer

Which fuel could be gasoline?



Yes For sure Petroleum produces gasoline fraction which is used as a fuel for cars

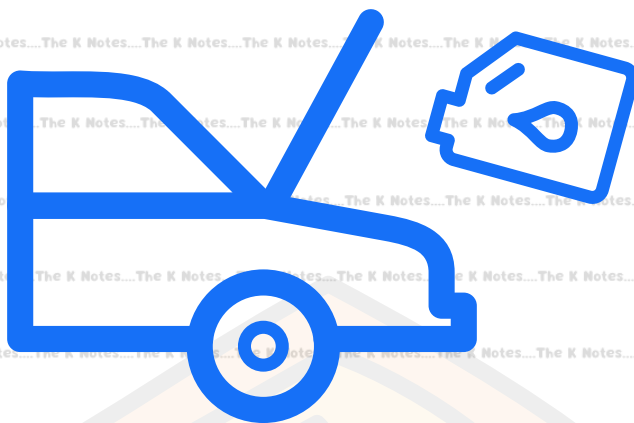
Do not confuse the name of Petrol commonly used for Gasoline in some countries for petroleum the main liquid from which all the fractions where obtained.



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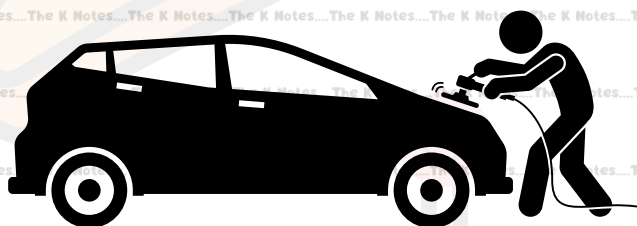
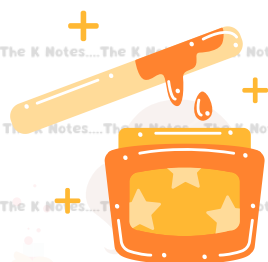
Day 1 Fuels Part 1

One more fraction used by cars is the lubricants from the **lubricating oil** fraction



That is used for lubricating motors and any mechanical devices

The lubricating oil fraction is used also to produce waxes and polishes



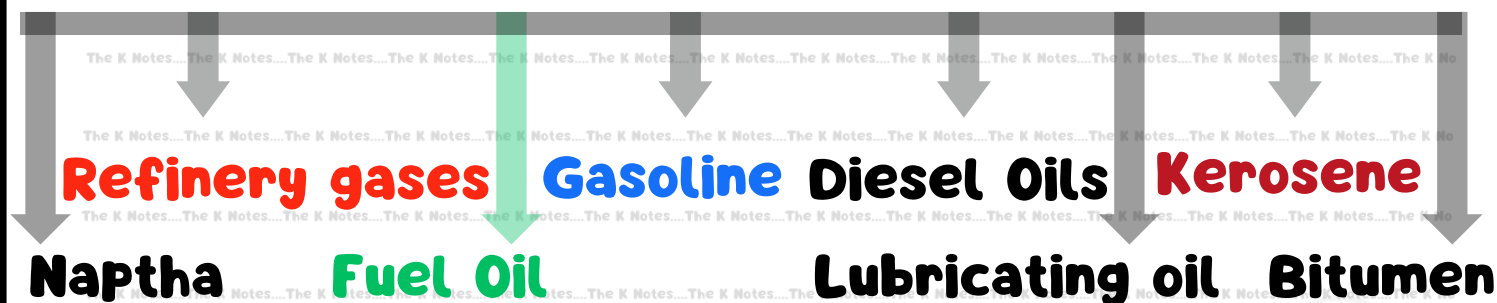
The Bitumen is one more important fraction from which roads are made



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Day 1 Fuels Part 1

Petroleum Different Fractions



Naptha is the last Fraction we will study :

**used to produce most chemical compounds
as acting as feed stock (meaning it is a start
material for other compounds)**



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Day 1 Fuels Part 1

Now is Part exam, Answer this past paper question

Some fractions obtained from petroleum are listed.

	fraction	use	position collected in the fractionating column
1	gasoline	waxes and polishes	below refinery gas
2	bitumen	making roads	above kerosene
3	kerosene	jet fuel	below gasoline
4	refinery gas	heating and cooking	above gasoline

Which rows are correct?

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

EXAM!

Try your best to answer before checking the answer in the next page .

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Day 1 Fuels Part 1

Answer :

Some fractions obtained from petroleum are listed.

	fraction	use	position collected in the fractionating column
1	gasoline	waxes and polishes	below refinery gas
2	bitumen	making roads	above kerosene
3	kerosene	jet fuel	below gasoline
4	refinery gas	heating and cooking	above gasoline

Which rows are correct?

A 1, 3 and 4

B 2, 3 and 4

C 3 and 4 only

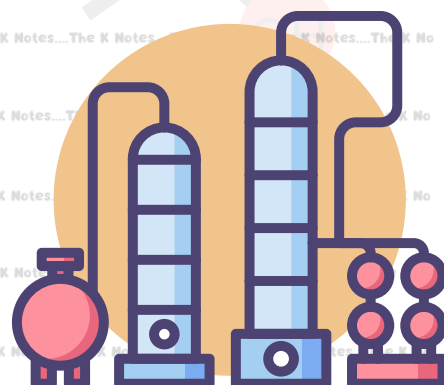
D 4 only



You need not just know the names but also to know the arrangement in order from top of Fractionating Tower to bottom.

Names and uses of Fractions as per Syllabus

- (a) refinery gas fraction for gas used in heating and cooking
- (b) gasoline / petrol fraction for fuel used in cars
- (c) naphtha fraction as a chemical feedstock
- (d) kerosene / paraffin fraction for jet fuel
- (e) diesel oil / gas oil fraction for fuel used in diesel engines
- (f) fuel oil fraction for fuel used in ships and home heating systems
- (g) lubricating oil fraction for lubricants, waxes and polishes
- (h) bitumen fraction for making roads



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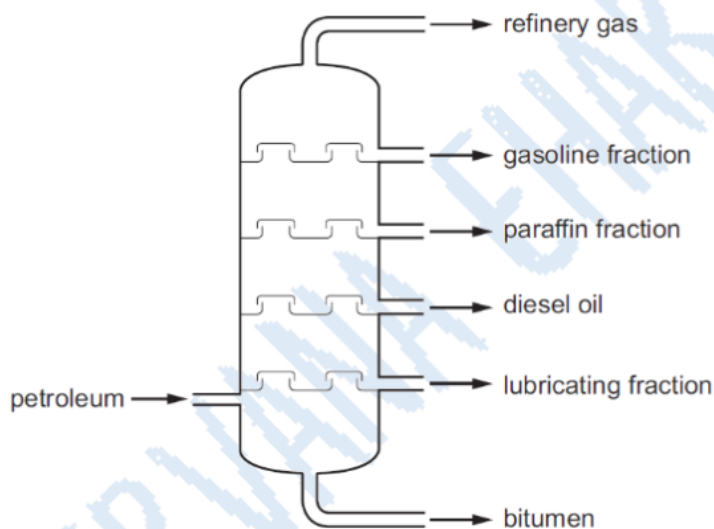
Day 1 Fuels Part 1

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

The fractional distillation of petroleum is shown.



Which fraction is the least volatile?

- A bitumen
- B diesel oil
- C gasoline fraction
- D refinery gas

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Day 1 Fuels Part 1

Alkenes and alkanes are homologous series of compounds containing carbon and hydrogen atoms.

(a) State the name of the type of compound made from carbon and hydrogen atoms only.

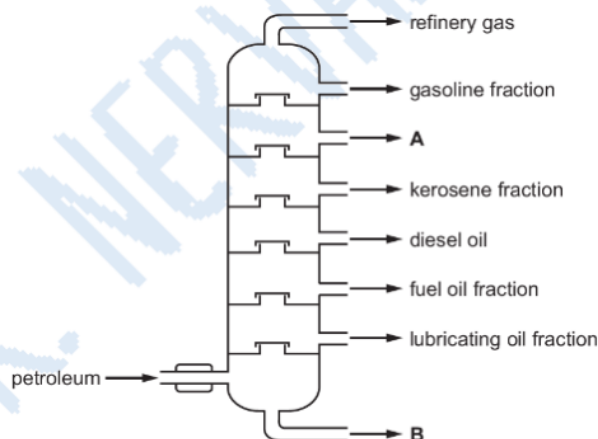
[1]

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Day 1 Fuels Part 1

Petroleum is a useful natural resource.

The diagram shows how petroleum can be separated into useful substances.



(a) What is the name of the separation process shown in the diagram?

[2]

(b) Name the fraction leaving at:

A

B

[2]

(c) Refinery gas is a mixture of hydrocarbons.

One refinery gas is butane, C_4H_{10} .

(i) Suggest the names of **two** other refinery gases.

..... and [2]

(ii) Write the chemical equation for the complete combustion of butane.

..... [2]

(iii) Name the toxic gas produced by the incomplete combustion of butane.

..... [1]

(d) Gasoline and kerosene are both fuels. They have different properties.

(i) Describe the differences in the properties given.

viscosity of the fuel

.....

flammability of the fuel

..... [2]

(ii) What difference in the molecules of gasoline and kerosene causes these differences in properties?

..... [1]

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Day 1 Fuels Part 1

The names of eight substances are given.

aluminium oxide	calcium oxide	ethanol	nitrogen
iron(III) oxide	methane	oxygen	silicon(IV) oxide

Answer the following questions about these substances.
Each substance may be used once, more than once or not at all.

State which substance is:

(a) the main constituent of natural gas

[1]

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Day 1 Fuels Part 1

tests on liquid V

One of the tests done on liquid V and the observations made are shown.

tests on liquid V	observations
A lighted splint was used to touch about 1 cm ³ of liquid V.	liquid V set on fire and burned with a smoky blue flame

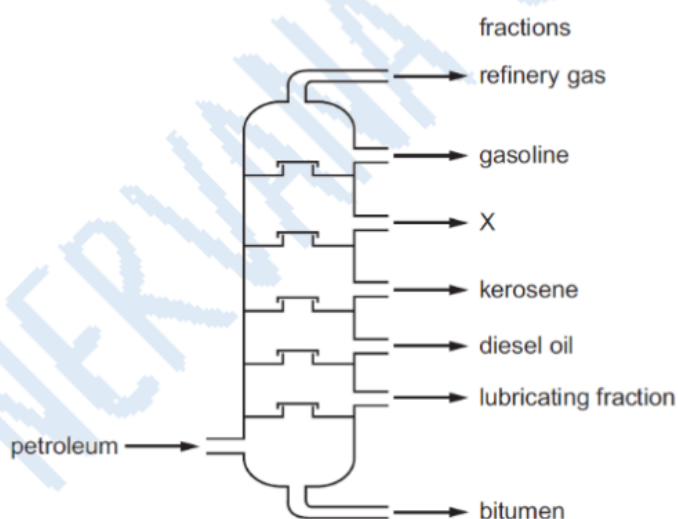
(e) Draw **one** conclusion about liquid V.

[1]

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Day 1 Fuels Part 1

34 What is the name of fraction X?



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

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Day 1 Fuels Part 1

11 Which substance is **not** used as a fuel?

- A bitumen
- B diesel
- C gasoline
- D hydrogen

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Day 1 Fuels Part 1

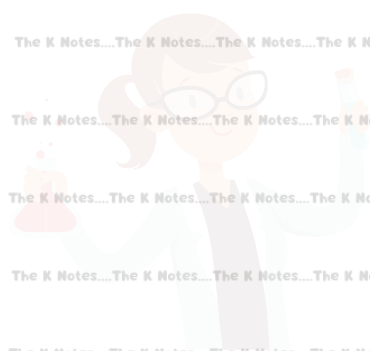
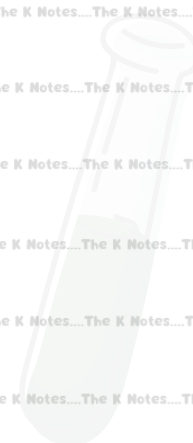
34 Petroleum is an important fossil fuel.

Which row correctly describes petroleum?

	type of substance	composition
A	compound	mainly hydrocarbons
B	compound	only hydrogen and carbon
C	mixture	mainly hydrocarbons
D	mixture	only hydrogen and carbon

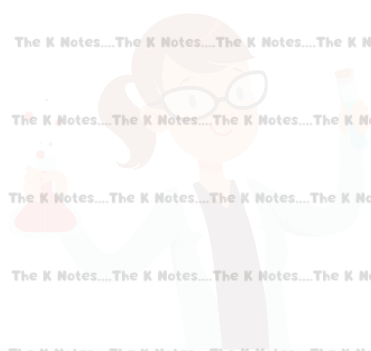
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Day 1 Fuels Part 1



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Day 1 Fuels Part 1



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Day 1 Fuels Part 1

