

DARRELL ER (COPYRIGHTED) ©



TOPIC 10.1: FUELS & CRUDE OIL

Common nucleic acid
 bases: Adenine, Guanine, Cytosine, and Thymine (DNA) or Uracil (RNA).
 The bases are linked together by hydrogen bonds to form the double helix structure of DNA. The sequence of bases in a gene determines the sequence of amino acids in a protein, which in turn determines the protein's function.

Chromosomes are made of DNA and proteins. They are the structures that carry the genes. Each chromosome contains many genes. The genes are arranged in a specific order on the chromosome.

Genetic information is passed from parents to offspring through the process of reproduction. This information is contained in the DNA molecules.

The DNA molecule is a long, thin, double-stranded structure. The two strands are twisted around each other to form a double helix. The strands are held together by hydrogen bonds between the nitrogenous bases.

The bases are Adenine, Guanine, Cytosine, and Thymine (DNA) or Uracil (RNA). Adenine pairs with Thymine (DNA) or Uracil (RNA), and Guanine pairs with Cytosine.

The sequence of bases in a gene determines the sequence of amino acids in a protein, which in turn determines the protein's function.

random | pt.asia.id



DNA codes a more specific code than RNA. Although RNA codes for proteins, it does not have the same level of specificity as DNA. The sequence of bases in a gene determines the sequence of amino acids in a protein, which in turn determines the protein's function.

The DNA molecule is a long, thin, double-stranded structure. The two strands are twisted around each other to form a double helix. The strands are held together by hydrogen bonds between the nitrogenous bases.

The bases are Adenine, Guanine, Cytosine, and Thymine (DNA) or Uracil (RNA). Adenine pairs with Thymine (DNA) or Uracil (RNA), and Guanine pairs with Cytosine.

The sequence of bases in a gene determines the sequence of amino acids in a protein, which in turn determines the protein's function.

Chromosomes are made of DNA and proteins. They are the structures that carry the genes. Each chromosome contains many genes. The genes are arranged in a specific order on the chromosome.

Genetic information is passed from parents to offspring through the process of reproduction. This information is contained in the DNA molecules.

THE ABOUT

CHAPTER ANALYSIS



MASTERY

- Straight forward topic
- Some memorising to be done



EXAM

- Tested in MCQ mainly
- Linked to 'fractional distillation' from Chapter 1.2 'Separation Techniques'



WEIGHTAGE

- Light overall weightage
- Constitute to around **1.5%** of marks for past 5 year papers

KEY CONCEPT

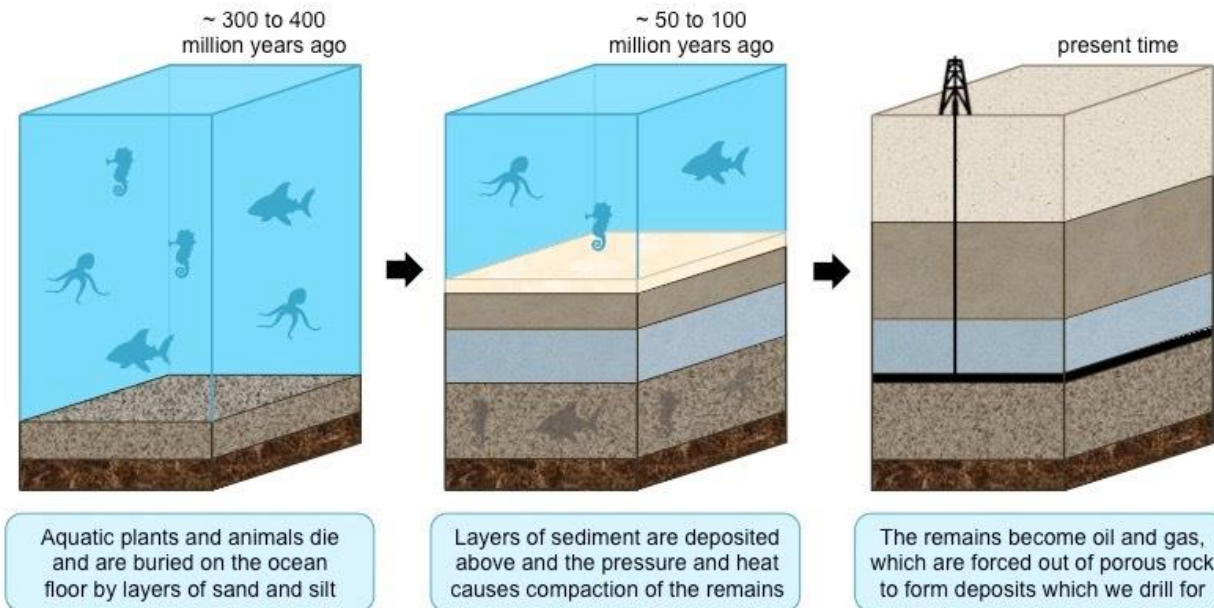
FUELS & CRUDE OIL

METHANE & PETROLEUM

FRACTIONAL DISTILLATION OF PETROLEUM



Fuels & Crude Oil



Fossil Fuels and Crude Oil

Fossil fuels are created due to compaction and heat from the remains of aquatic plants and animals.

Upon extraction, it is known as **crude oil or petroleum**, which is a thick black liquid. In order to be used as fuel for planes, cars and cooking, it has to undergo **fractional distillation** first.

Natural gas is a colourless gas found near fossil fuels in the earth's crust.

Hydrocarbons are compounds that contain **only hydrogen and carbon atoms**. Petroleum and natural gas are examples of the hydrocarbons.

Petroleum is a mixture of hydrocarbons that has differing numbers of carbon atoms while **natural gas** comprises mainly **methane CH₄** (up to 90%).

COMPETING USE

Petroleum, however, is a **non-renewable and limited resource**.

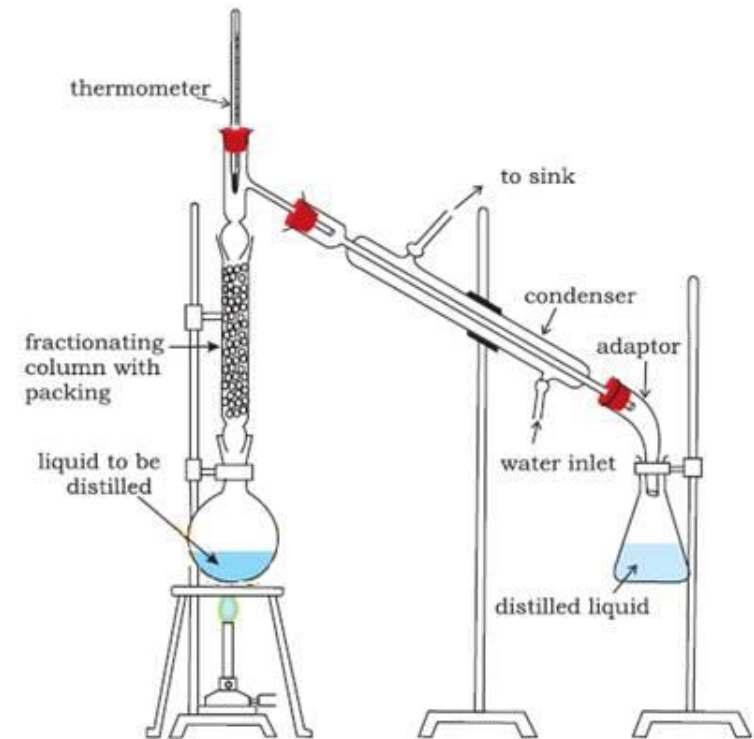
There is a **large demand from the petrochemical industry** as naphtha is used as a **chemical feedstock**.

Production of substances such as plastics and drugs will be affected when petroleum eventually runs out.

FRACTIONAL DISTILLATION DEPENDS ON DIFFERENT BOILING POINTS

Recall from 'Chapter 1.2 - Separation Techniques', **fractional distillation** is used to separate solutions with different boiling points.

A similar concept is used to separate the hydrocarbons into the different components!



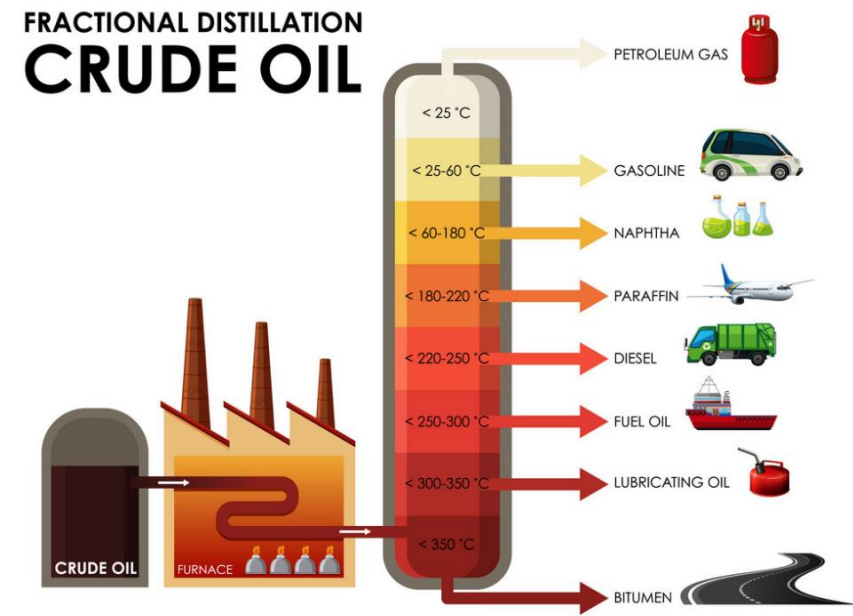
Fractional Distillation

Fraction	Boiling Point	Carbon atoms	Uses
Petroleum Gas	< 25°C	1- 4	Fuel for cooking
Petrol / Gasoline	25°C - 60°C	5 - 10	Fuel for car vehicles
Naphtha	60°C - 180°C	8 - 12	chemical feedstock
Paraffin	180°C - 220°C	10 - 16	Aircraft fuel, heating & cooking
Diesel	220°C - 250°C	15 - 25	Fuel for diesel engines like buses & lorries
Lubricating Oil	300°C - 350°C	19 - 35	Machine lubricants; polishes & waxes
Bitumen	>580°C	>70	Surfacing roads

FRACTIONAL DISTILLATION OF PETROLEUM

Petroleum is a **mixture of hydrocarbons** that has different number of carbon atoms. The **different no. of carbon atoms** result in them having **different boiling points**.

Petroleum needs to undergo **fractional distillation** to be separated into useful fractions.



CLASSIFICATION OF ORGANIC COMPOUNDS

HOMOLOGOUS SERIES

A **homologous series** is defined as a family of organic compounds that has

:

- Same general formula
- Same functional group
- Similar chemical properties (undergo similar chemical reactions)
- Gradual change in physical properties
- Each member differs from the next by $-\text{CH}_2$

FUNCTIONAL GROUP

A **functional group** is an atom or a group of atoms that is responsible for the chemical properties of the molecule:

- $\text{C}=\text{C}$ bond in alkenes
- $-\text{OH}$ group in alcohols
- $-\text{COOH}$ group in carboxylic acids
- $-\text{COO}-$ group in esters

NAMING OF ORGANIC COMPOUNDS

Prefix	Number
Meth-	1
Eth-	2
Prop-	3
But-	4
Pent-	5
Hex-	6
Hep-	7
Oct-	8
Non-	9
Dec-	10

Suffix	Homologous series	Example
-ane	Alkanes	Propane C ₃ H ₈
-ene	Alkenes	Butene C ₄ H ₈
-ol	Alcohol	Ethanol C ₂ H ₅ OH
-oic acid	Carboxylic Acid	Pentanoic acid C ₄ H ₉ COOH



For more notes & learning materials, visit:
www.overmugged.com



IG handle:
[@overmugged](https://www.instagram.com/overmugged)



Join our telegram
 channel:
[@overmugged](https://t.me/overmugged)



Need help?

DARRELL
 (Private tutor with **7**
years of experience)

8777 0921
(Whatsapp)

@Darreller
(telegram username)

'O' levels crash course program

Professionally designed crash course to help you get a **condensed revision** before your 'O' Levels!

The **4 hour session** focuses on going through **key concepts** and **identifying commonly tested questions!**

Our **specialist tutors** will also impart valuable **exam pointers and tips** to help you maximise your preparation and ace your upcoming national exam!

The crash courses will begin in **June 2021** and last till **Oct 2021**.

Register now on our [website](http://www.overmugged.com) and secure your slots!

