

Class 11th | Chemistry



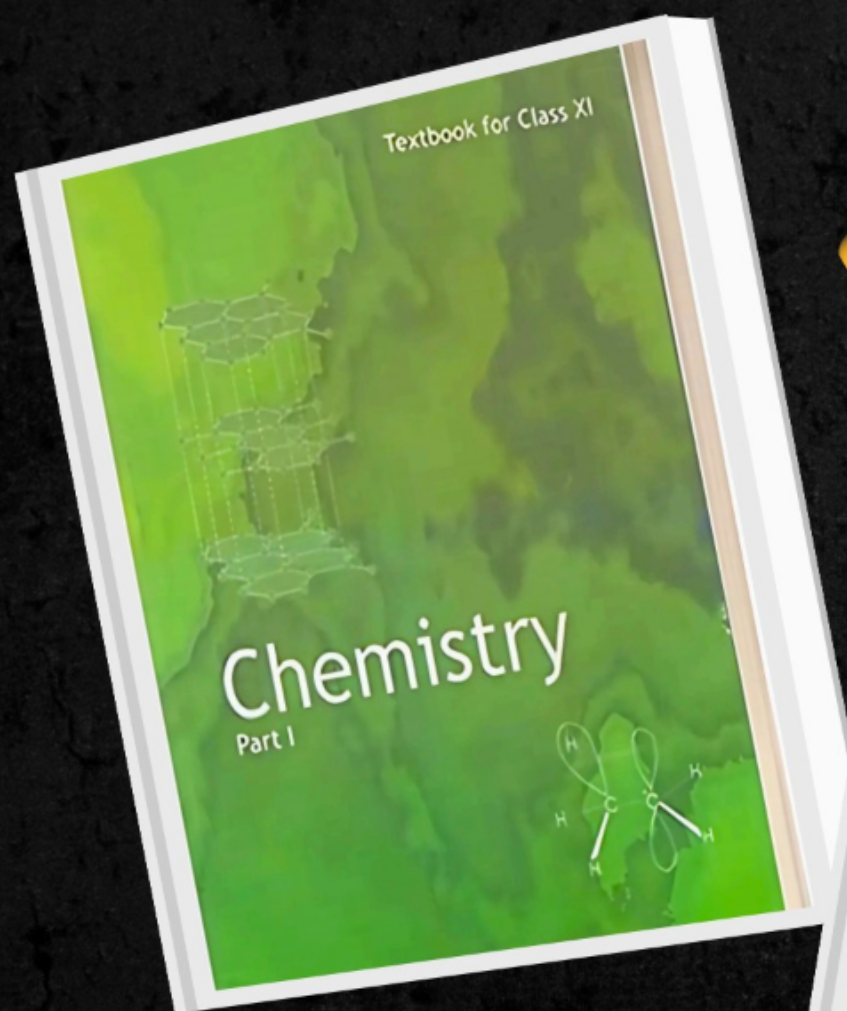
Unit : 1

Some Basic

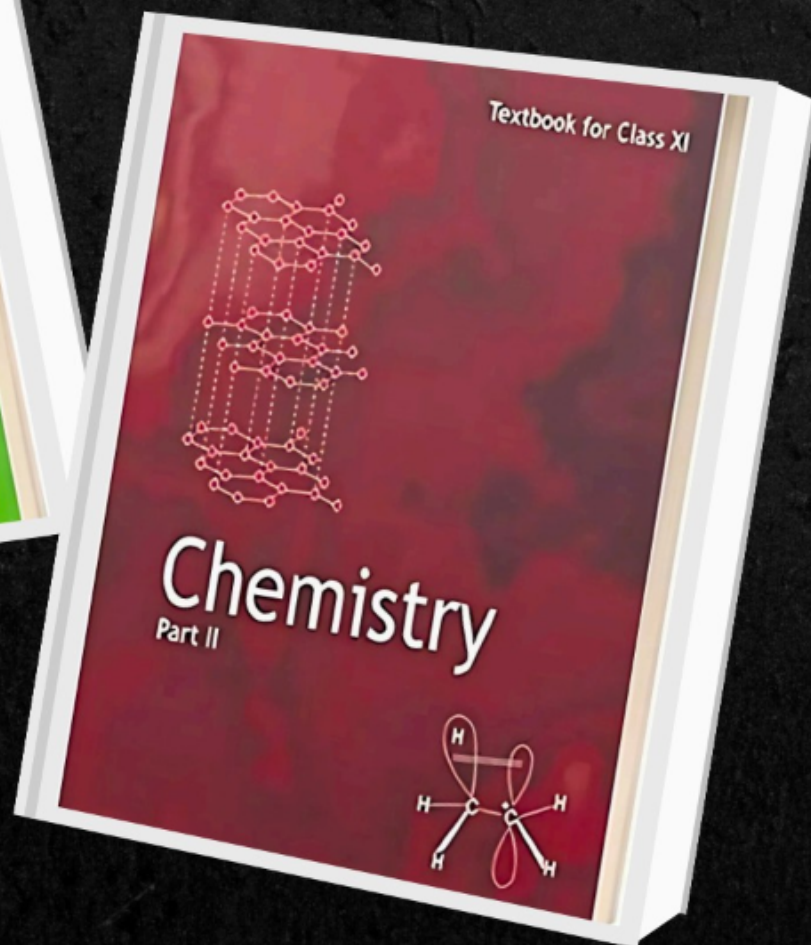
Concepts of Chemistry

Lecture - 1

NCERT



6 Chapters



3 Chapters

MISS EXCEPTION

KAISE PDHANE VLI HAIN ???

2025-26



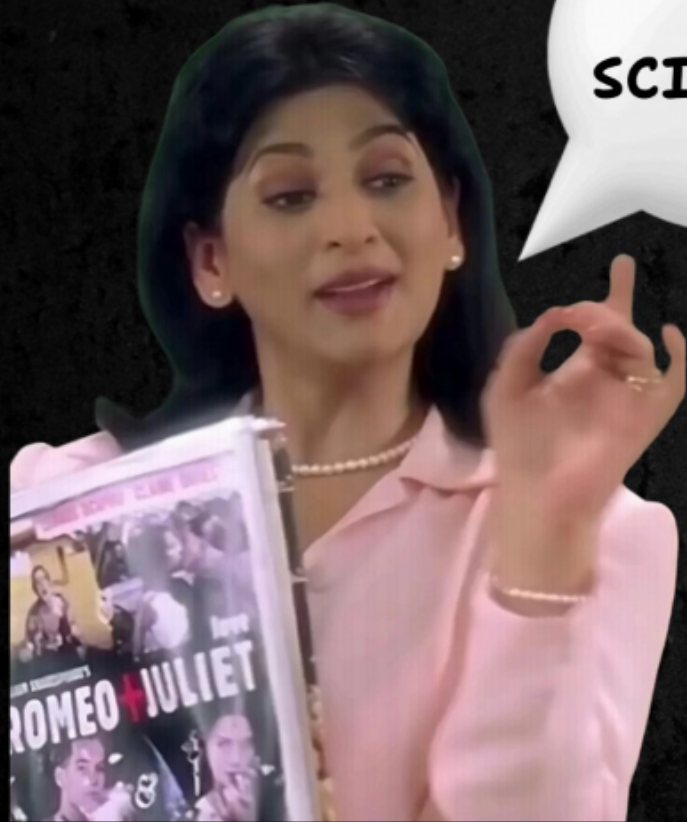
Toh Shuru krein ????

7 Marks

Favourite



?



Rahul...
SCIENCE KYA HAI ???

Science → Physics
→ Chemistry
→ Bio



“

Science is the study of the natural
and physical world through
observation, experimentation, and
analysis. It's a systematic way of
building knowledge about the
world around us.
Latin word - Scientia knowledge.

”

DEFINITION OF CHEMISTRY

Chemistry is the science of molecules & their transformations. It is the science not so much of the hundred elements but of the infinite variety of molecules that may be built from them.

~ Roald Hoffmann



→ Physical Chem.
→ Inorganic Chem
→ Organic Chem.

Importance of Chemistry

Chemistry in Medicines



Chemistry in Agriculture



Chemistry in Industry

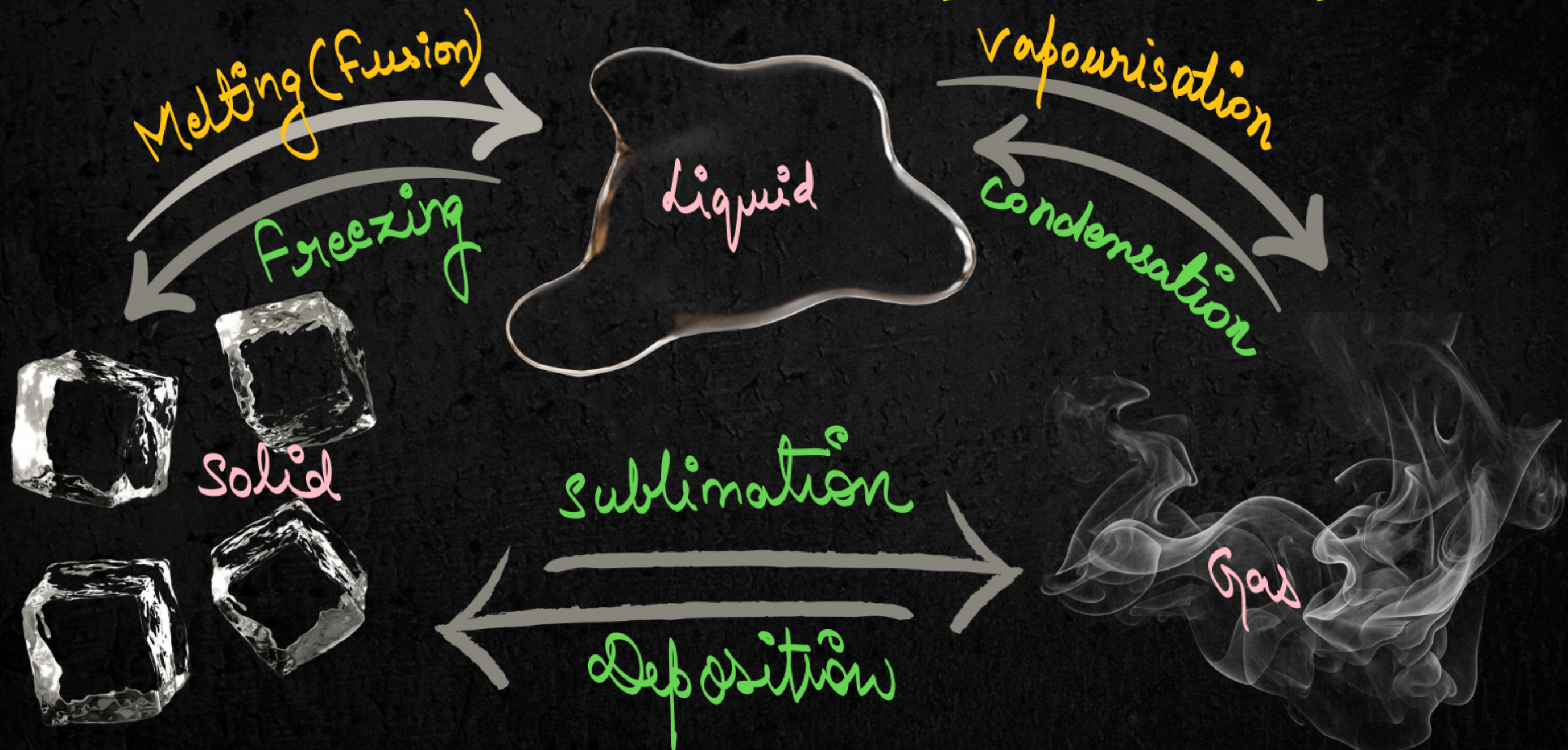


NATURE OF MATTER

Matter is defined as anything which occupies space and has mass, e.g., wood, book, water, air, petrol, plastics, iron etc. are all composed of matter.



→ Temp → Pressure
INTERCONVERSION OF STATES OF MATTER



CLASSIFICATION OF MATTER

1. Physical classification

- In physical classification, matter is classified as solid, liquid & gas., Plasma, BEC.
- The three states of matter are interconvertable. It may be done by changing the temperature and pressure.

2. Chemical classification

- In chemical classification, matter is classified as pure substances and mixtures. Materials found in nature are either single substances or consists of two or more substances.
- A sample containing only one substance is called pure substance. Samples containing more than one substance are not pure. They are called mixtures.

CHEMICAL.

MATTER

Mixtures

Homogeneous mixtures

Heterogeneous mixtures

Pure Substances

Elements

Compounds

CLASSIFICATION OF PURE SUBSTANCES

Metals

Non-Metals

Metalloids

1	2											13	14	15	16	17	18																															
1	H											B	C	N	O	F	He																															
2	Li	Be											Al	Si	P	S	Cl	Ar																														
3	Na	Mg	3	4	5	6	7	8	9	10	11	12	Zn	Ga	Ge	As	Se	Br	Kr																													
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu																																					
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe																														
6	Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn																														
7	Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rn	Cn	Uut	Uuq	Uup	Uuh	Uus	Uuo																														
			<table border="1"> <tr> <td>La</td><td>Ce</td><td>Pr</td><td>Nd</td><td>Pm</td><td>Sm</td><td>Eu</td><td>Gd</td><td>Tb</td><td>Dy</td><td>Ho</td><td>Er</td><td>Tm</td><td>Yb</td><td>Lu</td> </tr> <tr> <td>Ac</td><td>Th</td><td>Pa</td><td>U</td><td>Np</td><td>Pu</td><td>Am</td><td>Cm</td><td>Bk</td><td>Cf</td><td>Es</td><td>Fm</td><td>Md</td><td>No</td><td>Lr</td> </tr> </table>																La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu																																		
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr																																		

Metals
Non-Metals
Metalloids



1. Elements:

- An element is defined as a pure substance which contains only one kind of atoms.
- An element can neither be broken into simpler substances nor build from simpler substances by any method.

CLASSIFICATION OF PURE SUBSTANCES

2. Compounds:

- When two or more atoms of different elements combine, the molecule of a compound is formed.
- Compounds are pure substances and contain more than one kind of element.
- These elements have a fixed proportion by mass in the compound.

Types of Compounds

Organic Compounds

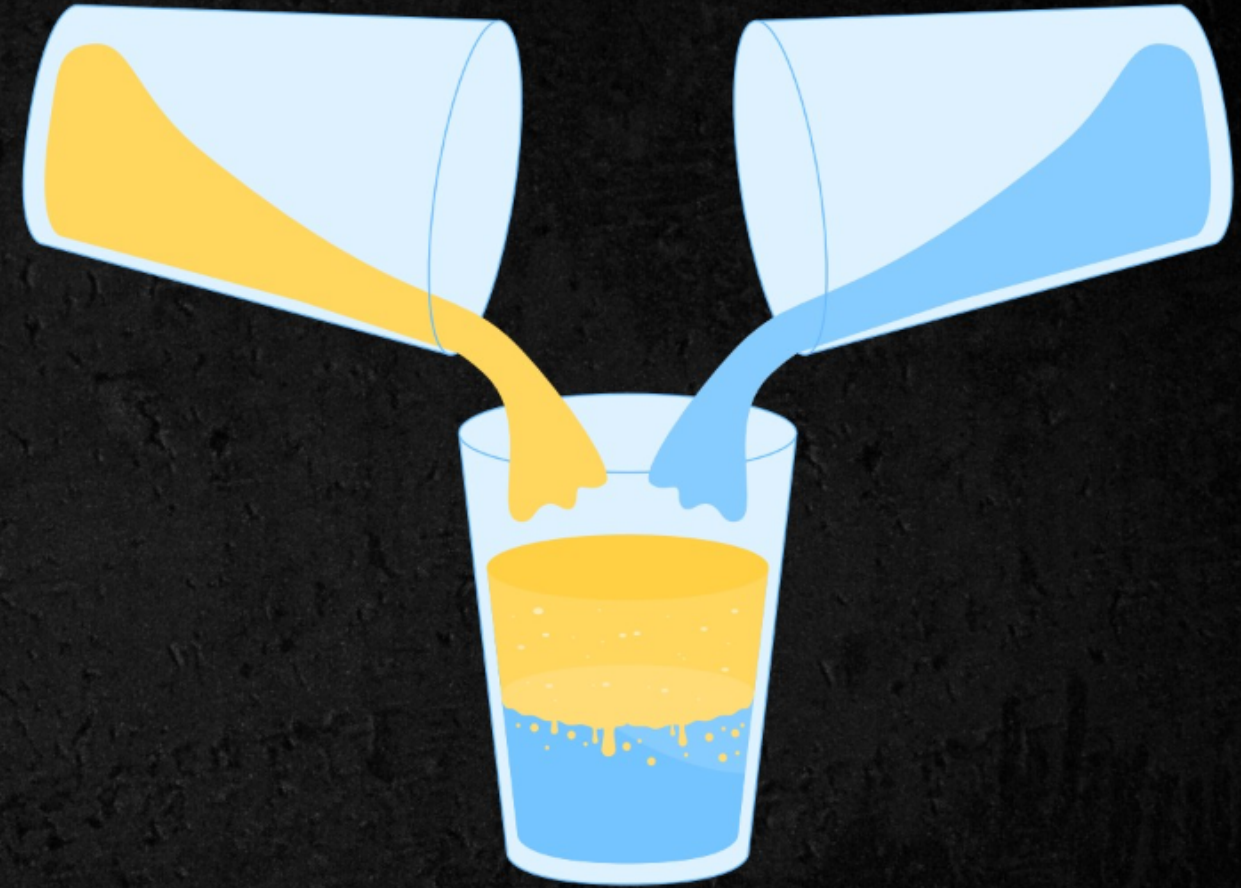
Such as C_2H_6 , C_2H_4 , C_2H_2 , C_6H_6 etc.

Inorganic Compounds

Such as NH_3 , CO_2 , HCl etc

MIXTURES

- Mixtures are not pure substances. A mixture may contain two or more substances (**elements or compounds**) in any proportion.
- The mixture shows the properties of its constituents. A mixture may be
- Separated into its constituents by physical methods.



Types of Mixtures



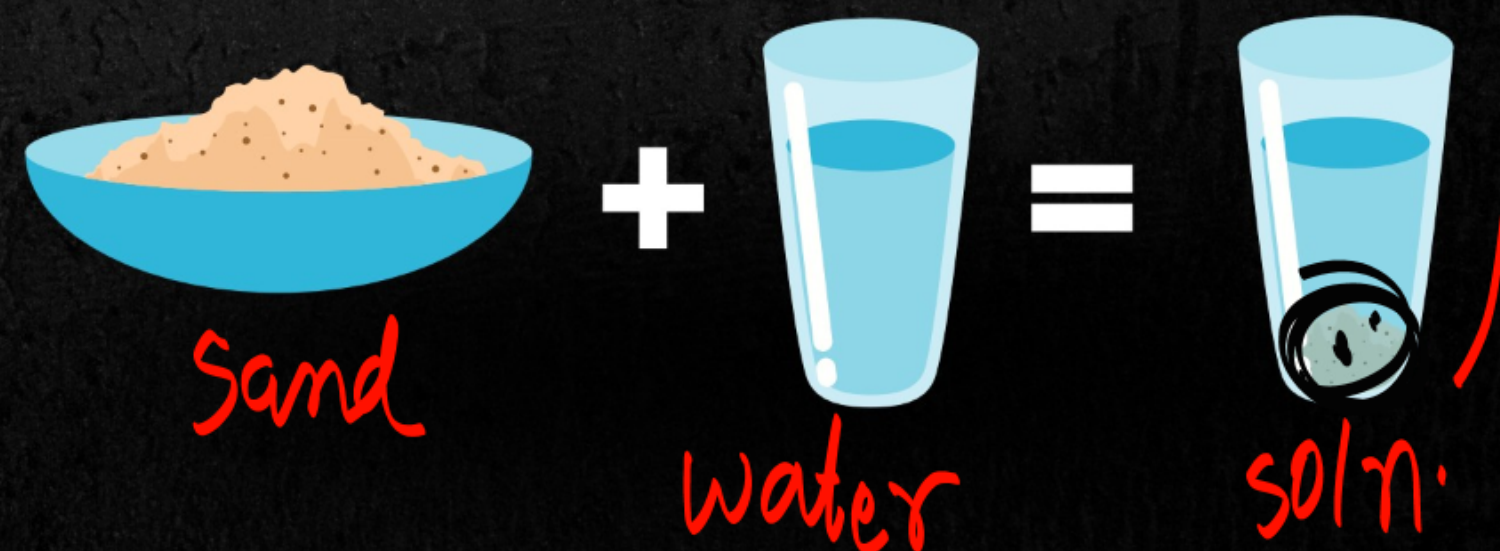
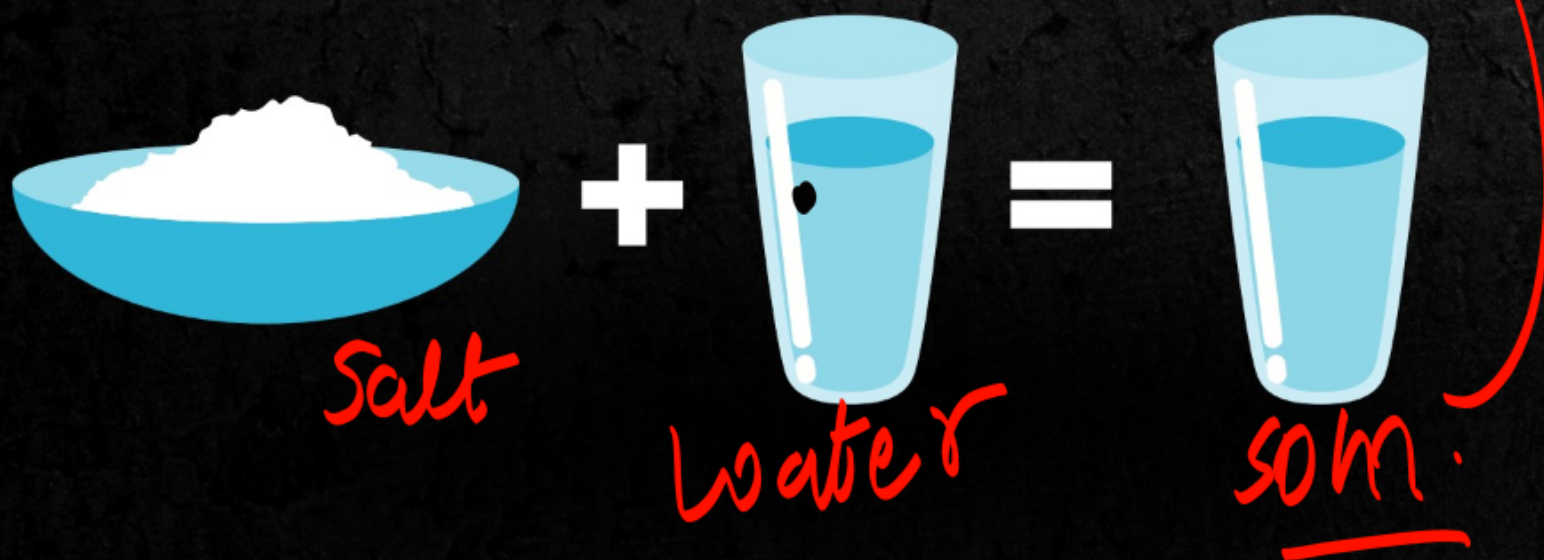
1. Homogeneous Mixtures

These are the mixtures which have uniform composition throughout.



2. Heterogeneous Mixture

These are the mixtures which do not have uniform composition throughout.



PROPERTIES OF MATTER

Physical properties can be measured or observed without changing the identity or the composition of the substance.

For example- density, volume, melting point & boiling point

The measurement or observation of chemical properties requires a chemical change to occur.

For example- flammability, solubility, heat from combustion, radioactivity, types of chemical bonds formed & acidity or basicity.



MEASUREMENT OF PHYSICAL PROPERTIES

The International System of Units

SI system is a modification of metric system and has seven base units pertaining to the seven fundamental scientific quantities.

Property	Unit	Abbreviation
Length	meter	m
Mass	kilogram	kg
Time	seconds	s
Amount	mole	mol
Temperature	kelvin	K
electric current	ampere	A
luminous intensity	candella	cd

FUNDAMENTAL & DERIVED **UNITS**

Fundamental units are independent units of measurement, while derived units are combinations of these fundamental units.

S.no	Physical quantity	Expression	Unit
1	<u>Area</u>	<u>length x breadth</u>	<u>m²</u>
2	<u>Volume</u>	area x height	<u>m³</u>
3	<u>Density</u>	mass / volume	Kgm ⁻³
4	<u>Velocity</u>	displacement / time	ms ⁻¹
5	<u>Momentum</u>	mass / velocity	Kgms ⁻¹
6	<u>Acceleration</u>	velocity / time	ms ⁻²
7	<u>Force</u>	mass/acceleration	kgms ⁻² or N
8	<u>Pressure</u>	force/area	Nm ⁻² or Pa
9	<u>Energy/(work)</u>	force x distance	Nm or J
10	<u>Surface Tension</u>	force/length	Nm ⁻¹

PREFIX IN SI UNITS

FACTORS	PREFIX	SYMBOL	DECIMAL
10^{24}	yotta	Y	1000 000 000 000 000 000 000 000 000
10^{21}	zetta	Z	1000 000 000 000 000 000 000 000
10^{18}	exa	E	1000 000 000 000 000 000 000
10^{15}	peta	P	1000 000 000 000 000 000
10^{12}	tera	T	1000 000 000 000 000
$*10^9$	giga	G	1000 000 000
$*10^6$	mega	M	1000 000
$*10^3$	kilo	k	1000
10^2	hecto	h	100
$*10^1$	deca	da	10

PREFIX IN SI UNITS

FACTORS	PREFIX	SYMBOL	DECIMAL
$\ast 10^{-1}$	deci	d	0.1
$\ast 10^{-2}$	centi	c	0.01
$\ast 10^{-3}$	milli-	m	0.001
$\ast 10^{-6}$	micro	μ	0.000 001
$\ast 10^{-9}$	nano	n	0.000 000 001
10^{-12}	pico	p	0.000 000 000 001
10^{-15}	femto	f	0.000 000 000 000 001
10^{-18}	atto	a	0.000 000 000 000 000 001
10^{-21}	zepto	z	0.000 000 000 000 000 000 001
10^{-24}	yocto	y	0.000 000 000 000 000 000 000 001

MEASUREMENT - MASS & WEIGHT

Mass of a substance is the amount of matter present in it, while weight is the force exerted by gravity on an object.

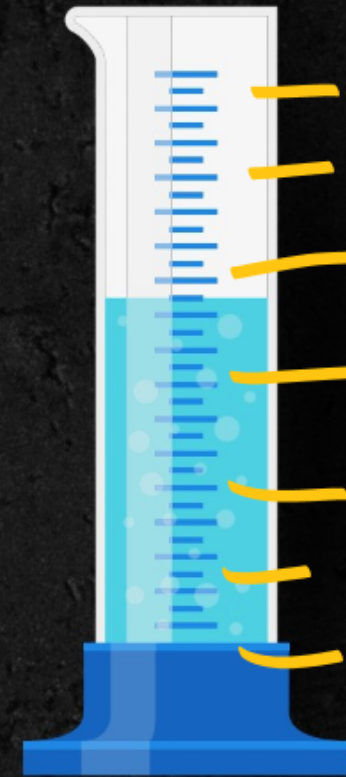
→ Same.



MEASUREMENT - VOLUME

Volume is the amount of space that a substance occupies.

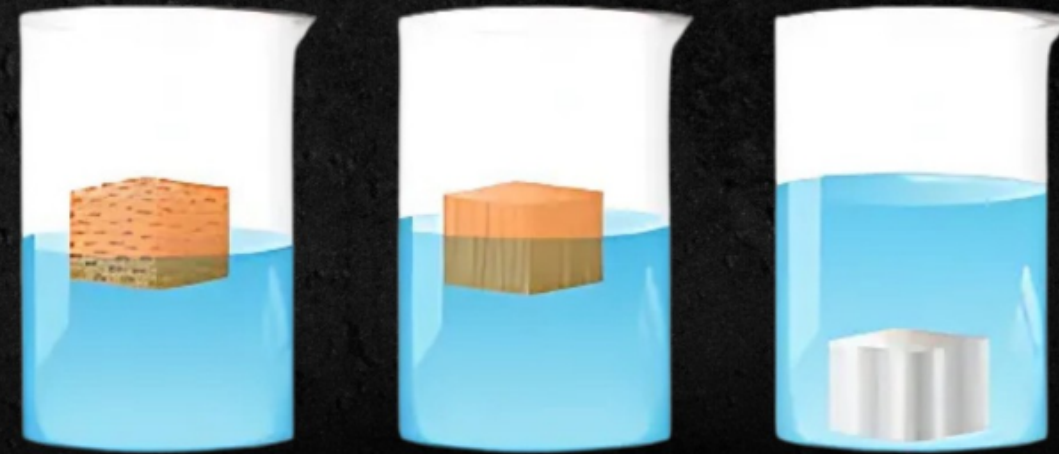
Volume of a liquid or solution can be measured by graduated cylinder, burette, pipette etc.



MEASUREMENT - DENSITY

Density of the substance is its
amount of mass per unit volume

$$\rho = \frac{\text{mass}}{\text{Vol.}}$$



MEASUREMENT - TEMPERATURE

Measure of degree of hottness & coldness

Celcius Degree $^{\circ}\text{C}$

Fahrenheit $\frac{9}{5}(^{\circ}\text{C}) + 32$

S.I. Kelvin $^{\circ}\text{C} + 273$



MEASUREMENT - TEMPERATURE

Convert 25°C in F & K → Room Temp.

$$\begin{aligned}
 F &= \frac{9}{5} (^{\circ}\text{C}) + 32 \\
 &= \frac{9}{5} \times 25 + 32 \\
 &= 45 + 32 = 77^{\circ}\text{F}
 \end{aligned}$$

$$\begin{aligned}
 K &= ^{\circ}\text{C} + 273 \\
 &= 25 + 273 \\
 &= 298\text{K}
 \end{aligned}$$

UNCERTAINTY IN MEASUREMENT

1.05

1.07.

1.09

CERTAIN DIGIT - 1.

UNCERTAIN DIGIT - 5, 7, 9.

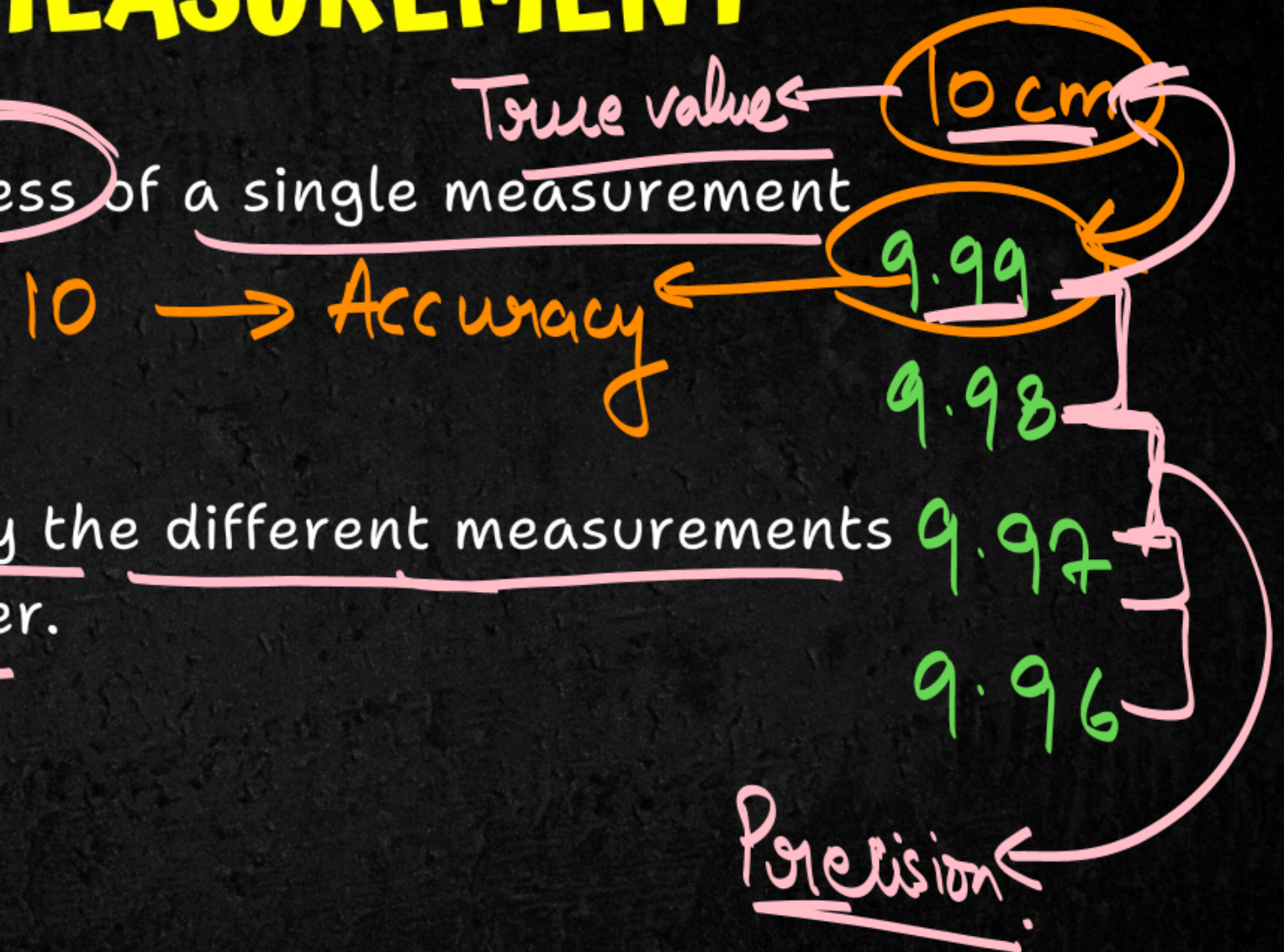
UNCERTAINTY IN MEASUREMENT

Accuracy - Accuracy describes the closeness of a single measurement to its true value.

TRUE VALUE KAAS PAS VALUE ANA

Precision - Precision describes how closely the different measurements of a given quantity agree with one another.

APAS MEIN SAME VALUE ANA



PRECISION & ACCURACY

Lets assume true value of some output is 3.

Student	Round1 output	Round1 output	Mean	Is Precise	Is Accurate
Hema	<u>2.80</u>	<u>3</u>	<u>2.90</u>	No ✗	No ✗
Rekha	<u>2.9</u>	<u>2.90</u>	<u>2.905</u>	Yes ✓	No ✗
Jaya	<u>3.01</u>	<u>2.99</u>	<u>3</u>	Yes ✓	Yes ✓
Sushma	<u>2.90</u>	<u>3.10</u>	<u>3</u>	No ✗	Yes ✓

SCIENTIFIC NOTATIONS

Scientific notation is a way of expressing numbers that are too large or too small to be conveniently written in decimal form, since to do so would require writing out an inconveniently long string of digits.

decimal moves left - power increase
decimal moves right - power decreases



SCIENTIFIC NOTATIONS

$N \times 10^n$ ($N = \text{value between } 1-10$)

27,600,000,000.



10 Units to the Left!

Moving to the Left = Positive Exponent

2.76×10^{10}

0.0000073



5 Units to the Right!

Moving to the Right = Negative Exponent

7.3×10^{-5}

27600000000

$N \times 10^n$

(1-10)

2.76×10^{10}

0.0000073

$N \times 10^n$

7.3×10^{-5}

SIGNIFICANT FIGURES

Definition: The significant figure in a number is the sum of certain digits and one uncertain (doubtful) digit.

5.28

certain
Digit

uncertain
Digit

More Significant figures, more will be the accuracy of answers.

RULES TO DETERMINE SIGNIFICANT FIGURES

1. All non-zero digits are significant.

$$2.763 \rightarrow 4 \text{ s.f.} \quad 98342 \rightarrow 5 \text{ s.f.}$$

2. All the zeros between two non-zeros digits are significant figures.

$$5.03 \rightarrow 3 \text{ s.f.}$$

$$90.02 \rightarrow 4 \text{ s.f.}$$

RULES TO DETERMINE SIGNIFICANT FIGURES

3. Ending zeros in the right of the decimal are significant figures.

$$2.90 \rightarrow 3 \text{ S.F.}$$

$$7.000 \rightarrow 4 \text{ S.F.}$$

4. Initial zeros are insignificant figures.

$$0.32 \rightarrow 2 \text{ S.F.}$$

$$0.054 \rightarrow 2 \text{ S.F.}$$

RULES TO DETERMINE SIGNIFICANT FIGURES

5. Exact number have infinite number of significant figures.

⑤ Balls $\rightarrow \infty$, 20 Books $\rightarrow \infty$

6. Power of 10 is insignificant.

2.9×10^{10} \rightarrow 2 s.f.

ROUNDING OFF THE **UNCERTAIN DIGITS**

- If the most right digit is > 5 the preceding number is **increased by one.**
- If the most right digit is < 5 , the preceding number is **retained.**
- If the most right digit is 5 then the preceding number is **not changed** if it is an **even number** but it is **increased by one** if it is an **odd number.**

Rounding off upto 2 significant figure

$$\begin{array}{c} \swarrow 5 \\ 2.23 \end{array} \rightarrow 2.2$$

$$\begin{array}{c} \nearrow 5 \\ 2.39 \end{array} \rightarrow 2.4$$

$$2.25 \rightarrow 2.2$$

$$\begin{array}{c} \downarrow \text{even} \\ 2.35 \end{array} \rightarrow 2.4$$

\downarrow
odd
+1

KUCH QUESTIONS HO JAYEIN ???

Solve kr toh loge na tum



Calculate the number of significant figures

$$7.683 \rightarrow 4$$

$$\underline{5.30} \times 10^6 \rightarrow 3$$

$$\underline{6.9543} \rightarrow 5$$

$$\underline{10.000} \rightarrow 5$$

$$\underline{0.030} \rightarrow 2$$

$$\underline{3 \text{ chairs}} \rightarrow \infty$$

$$\underline{90000} \rightarrow 1$$

$$\underline{3.800} \rightarrow 4$$

HOMework – COMMENT

- 1 Round off 0.0457 to 2 significant figures
- 2 Write 12500000000 in scientific notation

NEXT CLASS ? → App (Nexttoppers)

NOTES ?? → App.

TEST ??? → every chapter. → Practice Question.

KHATAM ! /

TATA !! /

BYE-BYE !!! /

Fir Milinge..... /