

CLASS IX LESSON PLAN

Topic: Is matter around us pure?

Objectives: After studying this chapter student will be able to:

- Differentiate between compounds and mixtures
- Explain homogeneous and heterogeneous mixtures
- Explain types of solutions
- Describe the physical and chemical changes
- Explain colloids, true solution and suspension

Previous knowledge testing: Student would be asked about elements, compounds, mixture and physical and chemical changes.

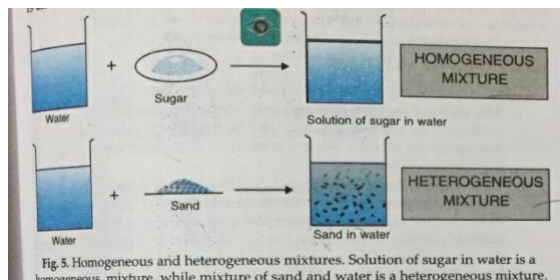
Innovative methods: <https://www.youtube.com/watch?v=C2RqAE0wbqk&feature=youtu.be>

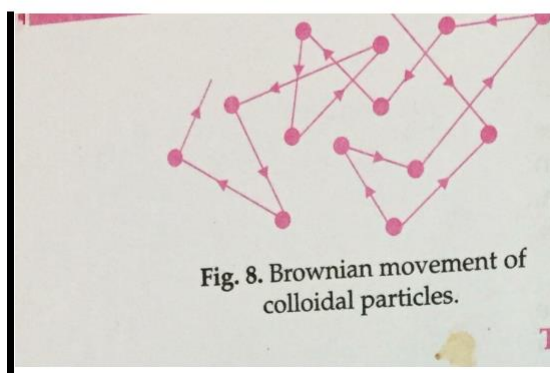
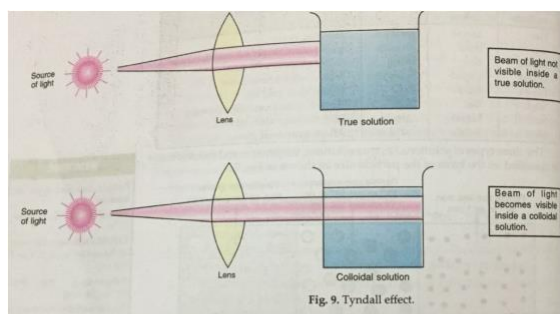
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Vocabulary: Aqueous, non-aqueous solution, saturated, unsaturated, colloidal, tyndall effect, Brownian motion, solubility

Procedure: Student would be taught about:

- Pure and impure substances
- Solution and its types
- Methods to express concentration of solution
- True solution, colloids, suspensions and its properties





Recapitulation: From the above topics, following points would be clear to the students:

- Expressing concentration of the solution
- Categorize different substances on the basis of their nature
- Colloids, true solution and suspension differences

Integration with other domain: Calculations for the numerical of the concentration of the solution can be correlated with mathematics.

Learning outcomes: Students will be able to know about:

- Matter and its types
- Solution and its types
- Expressing concentration by mass percentage and volume percentage

Co-scholastic activity: Students will be shown virtual lab activities related to this chapter.

It will help in enhancing learning process of students. This ensures that students get to learn effectively.

Topic – Structure of Atom

Objectives –

The Students will be able to –

- describe the different models of an atom.
- recall Thomson's atomic model.
- discuss Rutherford's model of an atom and its defects.
- Explain about Bohr's model of an atom.
- recall distribution of electrons in different orbits.
- Distinguish between atomic number, mass no, isotopes and isobars.
- Student will be told about Atomic number and Mass number.

$$Z=p=e$$

$$A=n+p$$

- Later on Bohr Bury Scheme would be explained by which distribution of electrons in different orbits will take place.
- Students will also be explained about valence electrons and valency, isotopes and isobars.

Previous knowledge testing – Students will be asked about the fundamental building blocks of matter i.e atoms and molecules.

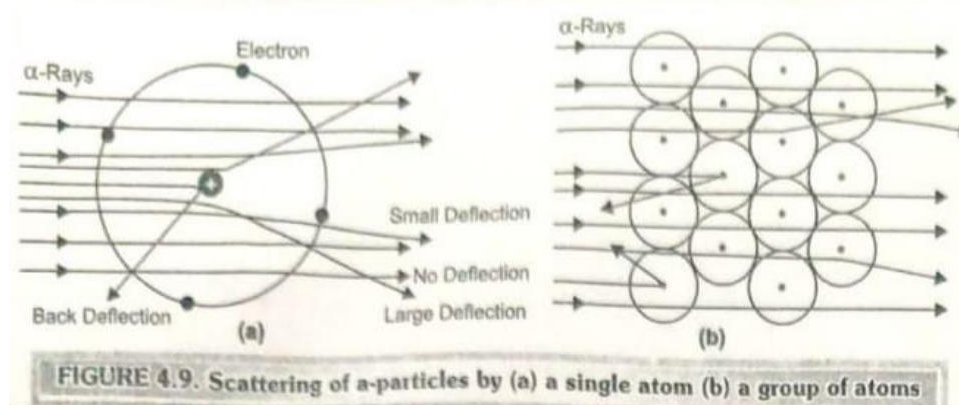
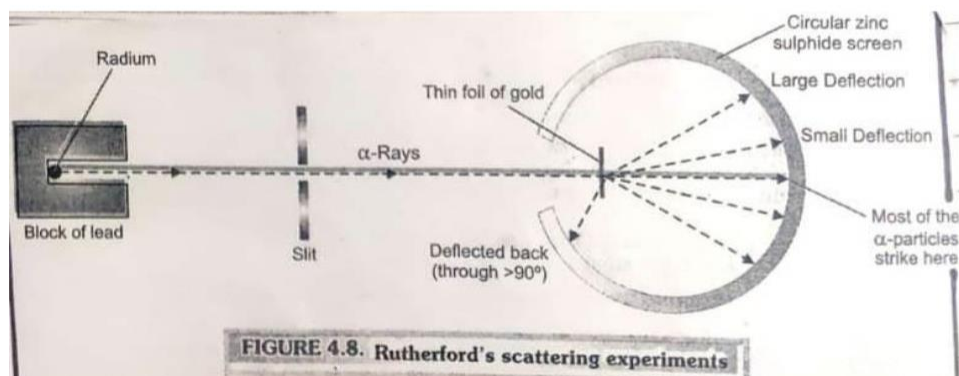
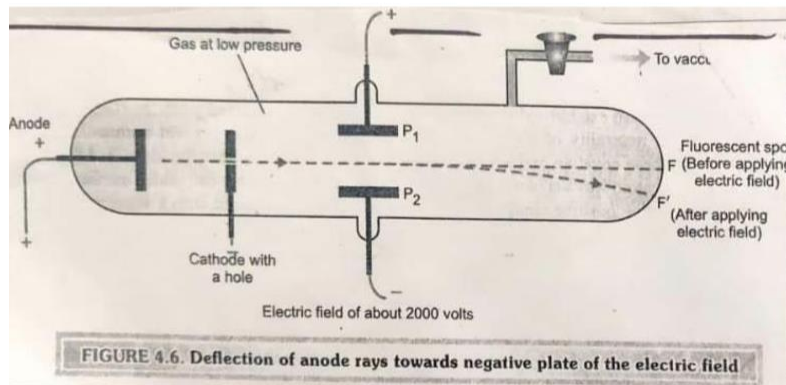
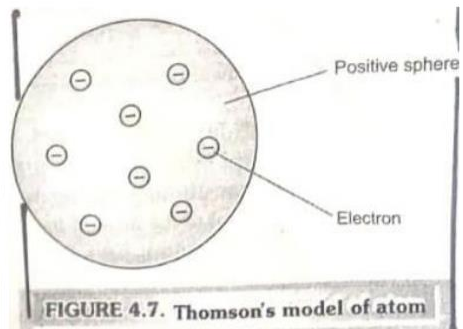
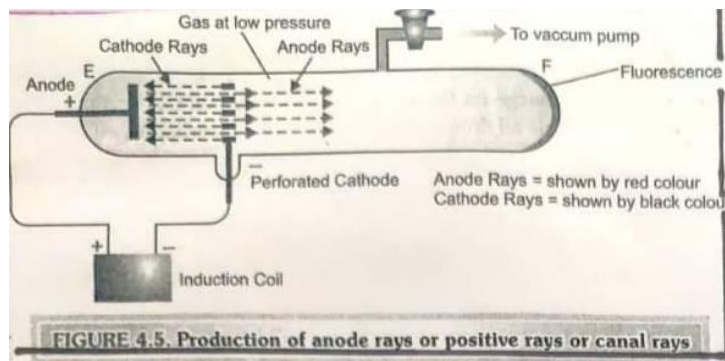
- What is atom made up of ?
- What makes the atom of one element different from the atom of another element.
- Are the atoms indivisible?

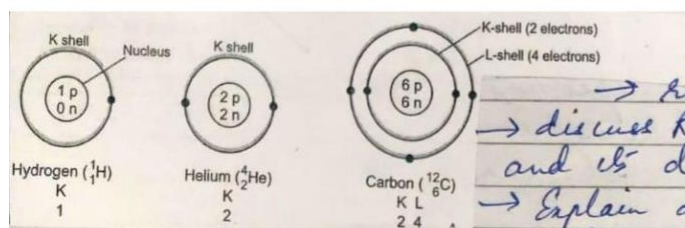
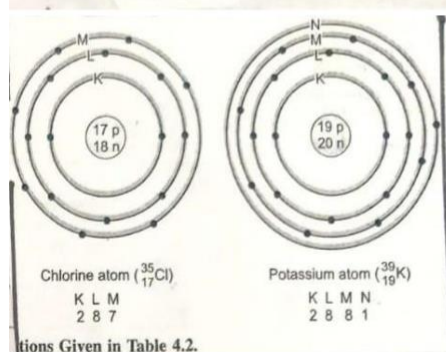
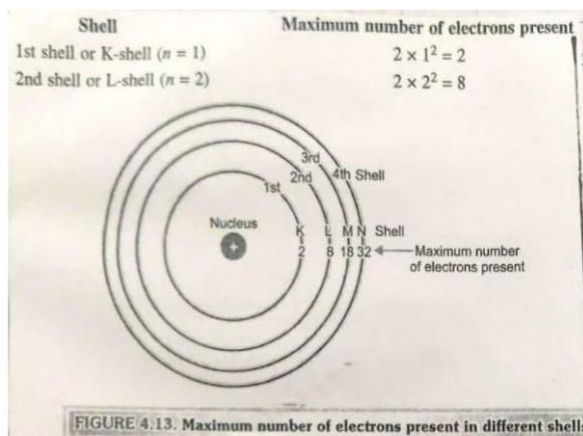
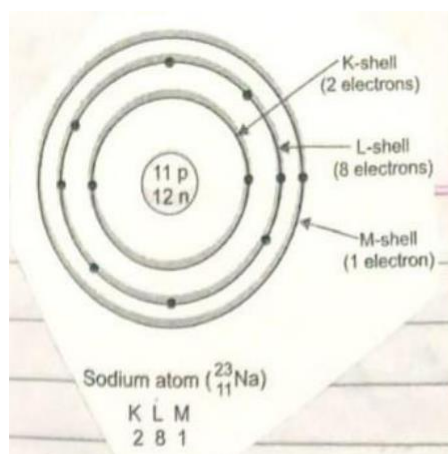
Vocabulary Used – Matter, Electron, Proton, Neutrons, cathode rays, anode rays, Thomson's Model of atom, Rutherford model, Atomic number, Mass number, Bohr's model, Distribution of electrons in shells, Valency, Isotopes, Isobars.

Innovative Method – Smart class, Black board, Book

Procedure –

- Students will be told about the existence of charged particles in matter.
- Students will be told about the discovery of cathode rays and electrons by showing discharge tube experiments in smart class.
- Discovery of canal rays or anode rays and Proton would be explained.
- Students will be told about Thomson's model of atom, Rutherford's model of atom in which scattering experiment would be explained.
- Drawbacks of Rutherford's model would also be explained along with Bohr's model of atom.
- Discovery of Neutron would also be explained.





Recapitulation –

- Students will be able to recapitulate the properties of electrons, protons, and neutrons.
- Students will be able to recapitulate the comparison of all proposed models of distribution of electrons in various shells for the first eighteen elements.
- Students will also draw various energy levels around the nucleus of an atom as proposed by Neils Bohr.

Integration with other domain –

Various topics can be correlated with English language. Various diagrams and like atomic structures of elements can be related with art work. Numericals related to different topics can be related to mathematical work.

Participation of students –

- Students will observe the existence of charged particles in matter by doing activity of rubbing the comb with dry hair and then bringing it near small pieces of paper.

- The numerical related to finding of no of neutrons/ electrons/ protons would be done by the students.
- Students would be able to draw atomic structures of some important elements and the arrangement of electrons in various shells.

Learning outcomes –

Students will know and understand

1. History and development of atomic model.
2. Understand and explain features of Bohr's model of atom.
3. Explain the arrangement of electron's in Bohr's atomic model.
4. Understand valency in quantitative terms using electronic configuration.
5. Explain the occurrence of isotopes and isobars in nature on basis of atomic model.

Assessment – Assessment of qualifying knowledge can be done on the basis of Lab activities, Group discussion or by assignments. It can also be done by questioning during class discussion

TABLE 4.2. Electronic configuration of first 20 elements.

Element	Symbol	Atomic No. (No. of electrons)	Distribution of electrons in different shells				Short representation of electronic configuration
			K	L	M	N	
Hydrogen	H	1	1				1
Helium	He	2	2				2
Lithium	Li	3	2	1			2, 1
Beryllium	Be	4	2	2			2, 2
Boron	B	5	2	3			2, 3
Carbon	C	6	2	4			2, 4
Nitrogen	N	7	2	5			2, 5
Oxygen	O	8	2	6			2, 6
Fluorine	F	9	2	7			2, 7
Neon	Ne	10	2	8			2, 8
Sodium	Na	11	2	8	1		2, 8, 1
Magnesium	Mg	12	2	8	2		2, 8, 2
Aluminium	Al	13	2	8	3		2, 8, 3
Silicon	Si	14	2	8	4		2, 8, 4
Phosphorus	P	15	2	8	5		2, 8, 5
Sulphur	S	16	2	8	6		2, 8, 6
Chlorine	Cl	17	2	8	7		2, 8, 7
Argon	Ar	18	2	8	8		2, 8, 8
Potassium	K	19	2	8	8	1	2, 8, 8, 1
Calcium	Ca	20	2	8	8	2	2, 8, 8, 2

Atoms and Molecules

Objectives –

The students will be able to

- State the law of conservation of mass.
- Discuss the law of definite proportion.
- Describe Dalton's Atomic theory.
- Compare atomic number and mass number.
- Determine valency, calculate molecular mass.
- Explain the term atomicity & mole concept.

Previous knowledge testing –

Students will be asked –

- How do elements combine to form compounds?
- Particle nature of matter.
- Particles which form matter.
- Physical and chemical changes.
- mass.
- Chemical equations.
- Elements and their symbols.
- Chemical composition of a molecule.
- Can we divide the pure form of matter (element and compounds) further and find the smallest particles of matter?
- Rules for writing chemical formula and name for a compound.

Vocabulary Used –

Historical account of divisibility of matter, Law of chemical combination, Law of constant proportions, Dalton's Atomic theory, Atom, Modern Symbols of Atoms of the elements, Atomic mass, Molecule, ion, Writing chemical formulae, mole concept.

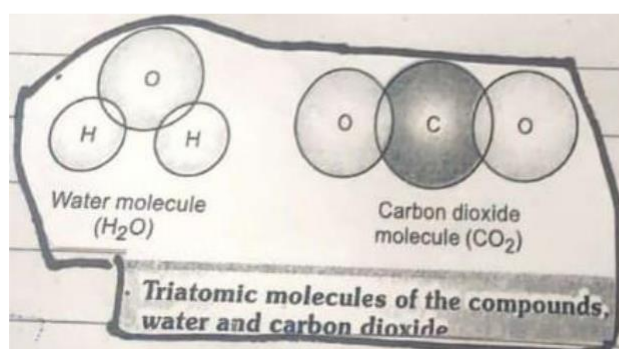
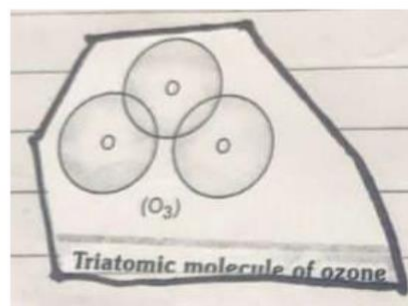
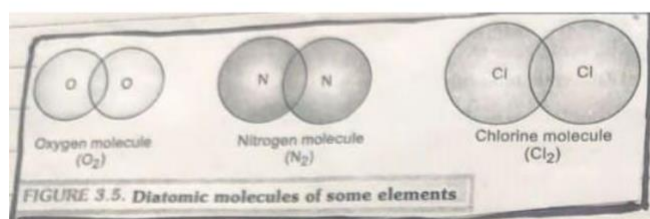
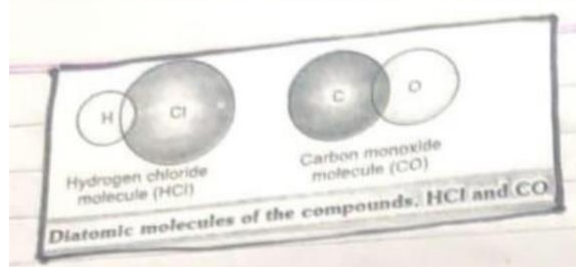
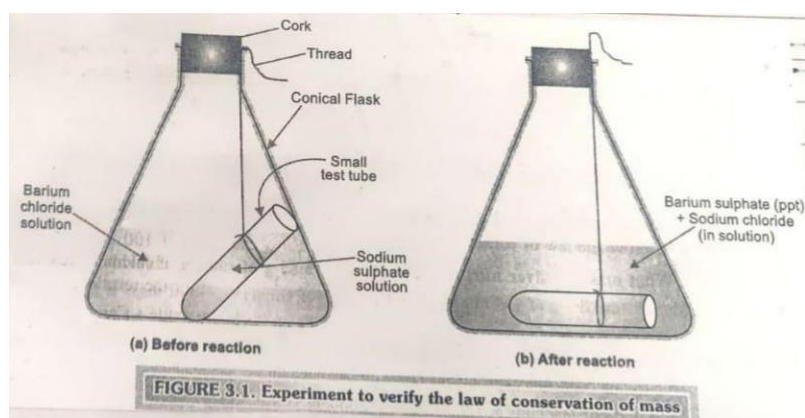
Innovative methods –

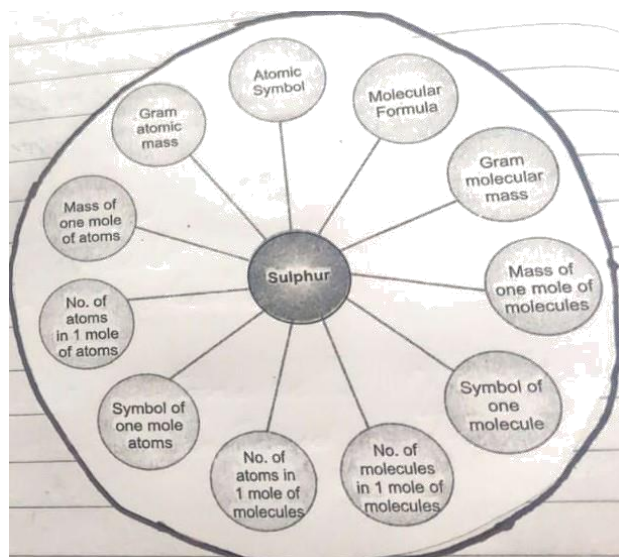
- An activity will be performed by taking BaCl_2 & Na_2SO_4 in the laboratory to explain the law of conservation of mass.
- They will actively participate in various discussions in which students will do cross talks on points supporting original and modified Dalton's atomic theory.

Procedure –

- Students will be told about history of divisibility of matter.

- Laws of chemical combination (Law of conservation of mass will be explained by explaining the activity in which BaCl_2 & Na_2SO_4 taken.
- Students will be explained Law of constant proportions by taking the example of water.
- Main postulates of Dalton's atomic theory will be explained by giving examples.
- Students will be explained Modern day symbols of elements with some guidelines for writing the symbols.
- Students will also be told about the remarkable concept – Atomic mass.
- Different examples for Molecules of elements, molecule of compounds will also be explained. Two types of ions and rules for writing chemical formula will also be taken.
- Very important topic mole concept will also be explained by giving numerical.





Recapitulation –

- Students will be able to recapitulate two laws of chemical combination and then do numericals on the basis of these laws.
- They will also recapitulate Dalton's atomic theory, main postulates followed by its drawbacks.
- They will also draw the table of symbols of different elements with their valencies.
- On the basis of Atomic masses they will also do numerical based on Molecular mass & formula mass.
- Students will also recapitulate positively charged ions & Negatively charged ions and also do the rules for writing chemical formula.
- Numericals based on Mole concept will be done in which one mole represents 6.022×10^{23} particles will also be taken.

Participation of Students –

- Students will observe the activity to prove the law of conservation of mass.
- Students will solve the numerical related with both the laws.
- Students will speak about the characteristics of atoms and will write the symbols of elements in their notebook.
- Students will write the atomicity of various molecules i.e. monoatomic, diatomic, triatomic, and polyatomic.
- Students would be able to write the formula of various compounds and also numerical based on atomic masses.
- They would be able to solve the numerical related to mole concept.

Learning Outcomes –

- Students will be able to
 - list the postulates of Dalton's Atomic theory
 - State and write the atomic symbols of first 20 elements.
 - State and write the atomic number and mass number for first 20 elements.

- State and write the Law of conservation of mass.
- State and write the Law of constant proportion.



They will identify element present in a compound. Recall the molecular mass of elements. Compute the molecular mass of compounds.

Assessment – Assessment of qualifying knowledge can be done on the basis of lab activities, group discussion or by assignments.

It can also be done by questioning during class discussion.

3.8.4. Chemical Formulae of Some Simple Ionic Compounds
Applying the same rules, a few examples are given below :

(1) Formula of sodium chloride

Symbol	Na	Cl	
Charge	1+	1-	
Valency	1	1	

Formula = NaCl

(2) Formula of magnesium chloride

Symbol	Mg	Cl	
Charge	2+	1-	
Valency	2	1	

Formula = $MgCl_2$

(3) Formula of calcium oxide

Symbol	Ca	O	
Charge	2+	2-	
Dividing by common factor, 2	1+	1-	

Formula = CaO

(4) Formula of aluminium oxide

Symbol	Al	O	
Charge	3+	2-	

Formula = Al_2O_3

(1) Formula of potassium nitrate

Symbol	K	(NO ₃)	
Charge	1+	1-	

Formula = KNO₃

(2) Formula of sodium sulphate

Symbol	Na	(SO ₄)	
Charge	1+	2-	

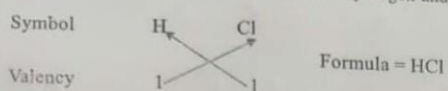
Formula = Na₂SO₄

(3) Formula of calcium nitrate

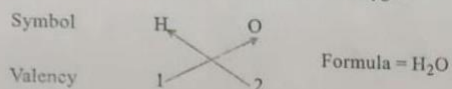
Symbol	Ca	(NO ₃)	
Charge	2+	1-	

Formula = Ca(NO₃)₂

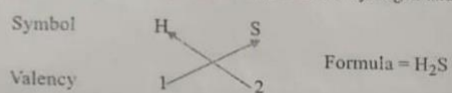
(1) Formula of hydrogen chloride. The elements present are hydrogen and chlorine.



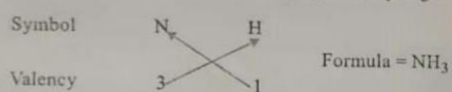
(2) Formula of water. The elements present are hydrogen and oxygen.



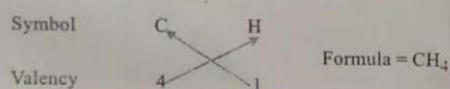
(3) Formula of hydrogen sulphide. The elements present are hydrogen and sulphur.



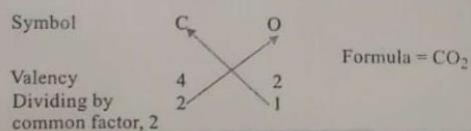
(4) Formula of ammonia. The elements present are nitrogen and hydrogen.



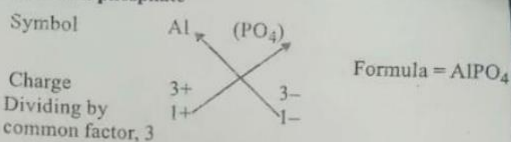
(5) Formula of methane. Methane contains carbon and hydrogen.



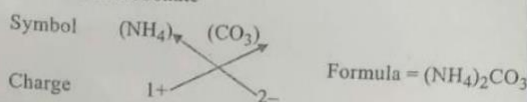
(6) Formula of carbon dioxide. It contains carbon and oxygen.



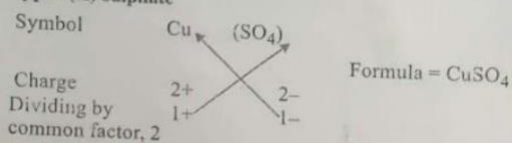
(4) Formula of aluminium phosphate



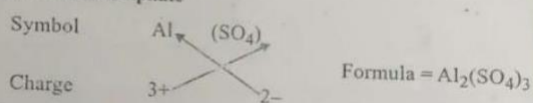
(5) Formula of ammonium carbonate



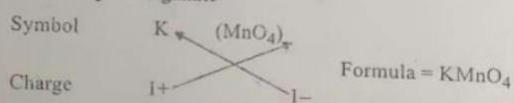
(6) Formula of copper (II) sulphate



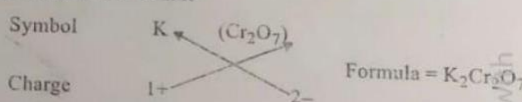
(7) Formula of aluminium sulphate



(8) Formula of potassium permanganate



(9) Formula of potassium dichromate



(10) Formula of calcium hydroxide

