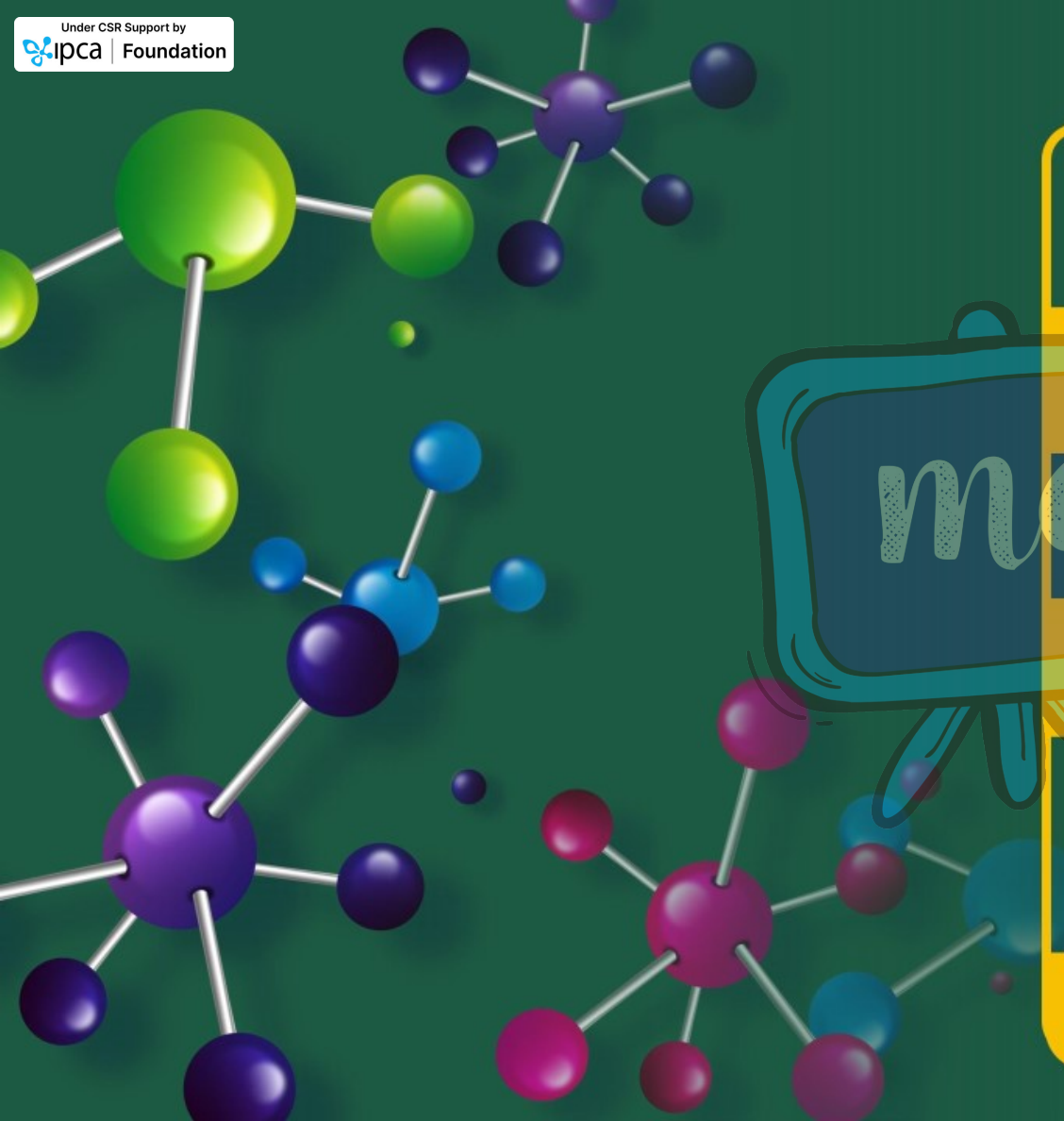
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Class–9

SCIENCE

Chapter – 3

ATOMS AND MOLECULES

Part – 4

Intext Questions

Deeksha Pahilajani

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INTEXT QUESTION

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1. In a reaction, 5.3 g of sodium carbonate reacted with 6 g of acetic acid. The products were 2.2 g of carbon dioxide, 0.9 g water and 8.2 g of sodium acetate. Show that these observations are in agreement with the law of conservation of mass.

sodium carbonate + acetic acid → sodium acetate + carbon dioxide + water

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Answer :

Sodium carbonate (5.3g) + acetic acid (6g) → Sodium acetate (8.2g) + carbon dioxide (2.2g) + water (0.9g)

As per the law of conservation of mass, the total mass of reactants must be equal to the total mass of products.

As per the above reaction, L.H.S. = R.H.S.

i.e., 5.3g + 6g = 2.2g + 0.9 g + 8.2 g = 11.3 g

Hence, the observations are in agreement with the law of conservation of mass.

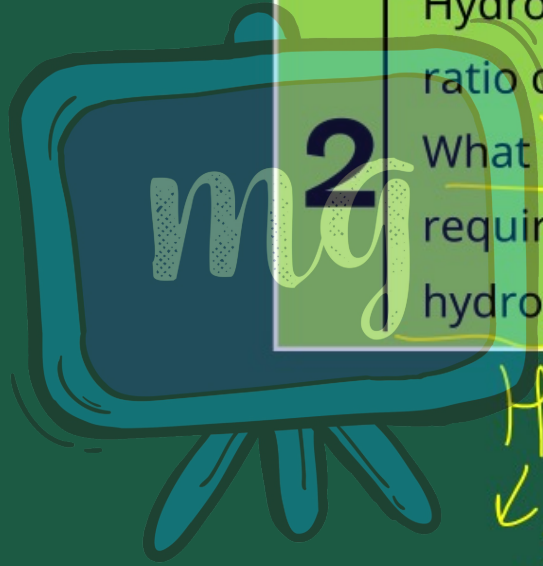
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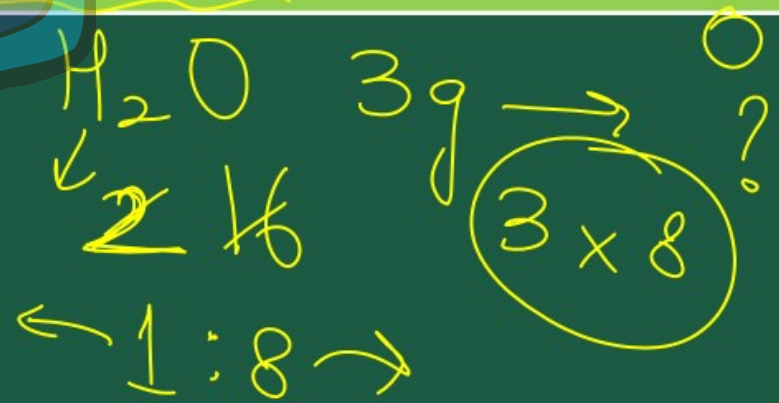
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2 Hydrogen and oxygen combine in a ratio of 1 : 8 by mass to form water. What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas?





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Answer :

We know hydrogen and oxygen mix in a ratio 1 : 8. For every 1g of hydrogen, it is 8g of oxygen.

Therefore, for 3g of hydrogen, the quantity of oxygen = 3 × 8 = 24g

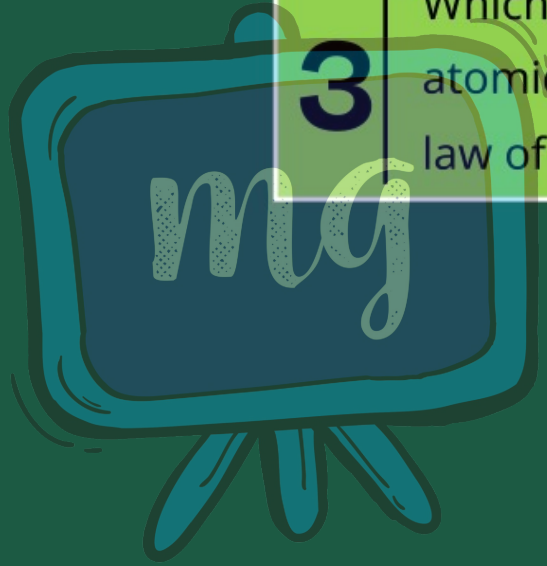
Hence, 24g of oxygen would be required for the complete reaction with 3g of hydrogen gas.

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INTEXT QUESTION

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3 Which postulate of Dalton's atomic theory is the result of the law of conservation of mass?

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INTEXT QUESTION

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3 Which postulate of Dalton's atomic theory is the result of the law of conservation of mass?

Answer :

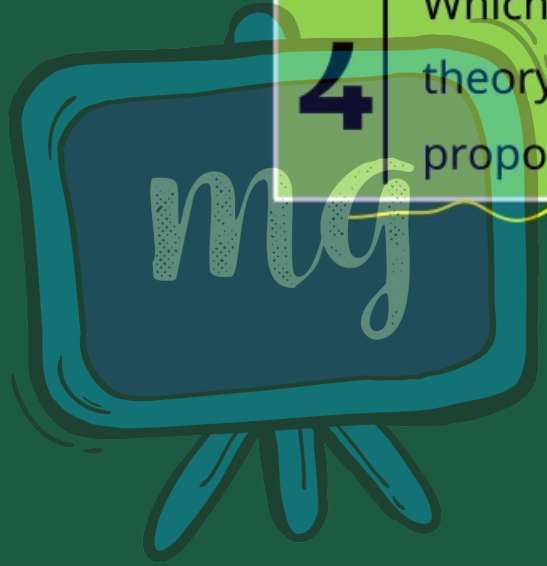
"Atoms cannot be created nor be destroyed in a chemical reaction."

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4 Which postulate of Dalton's atomic theory can explain the law of definite proportions?

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INTEXT QUESTION

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4 Which postulate of Dalton's atomic theory can explain the law of definite proportions?

Answer :

The postulate of Dalton's atomic theory that can explain the law of definite proportions is that —

The relative number and kinds of atoms are equal in a given compound.

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INTEXT QUESTION

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5 Define the atomic mass unit.

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INTEXT QUESTION

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5 Define the atomic mass unit.

Answer :

An atomic mass unit is a unit of mass used to express the weights of atoms and molecules where one atomic mass is equal to 1/12th the mass of one carbon-12 atom.

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6 Why is it not possible to see an atom with the naked eyes?

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INTEXT QUESTION

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6 Why is it not possible to see an atom with the naked eyes?

Answer :

An atom is too small to be seen with naked eyes.

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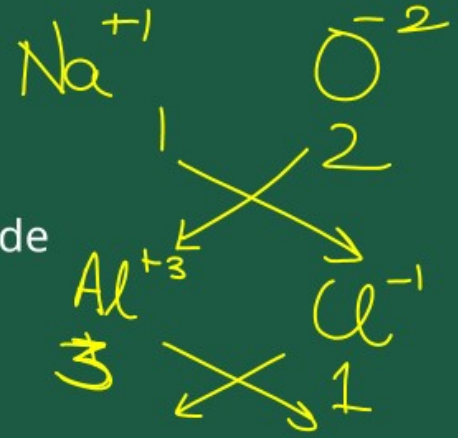
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7 Write down the formulae of —

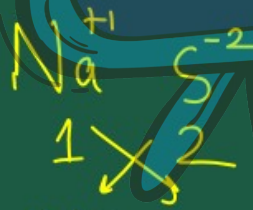
(i) sodium oxide

Na_2O



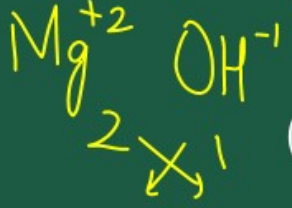
(ii) aluminium chloride

$AlCl_3$



(iii) sodium sulphide

Na_2S



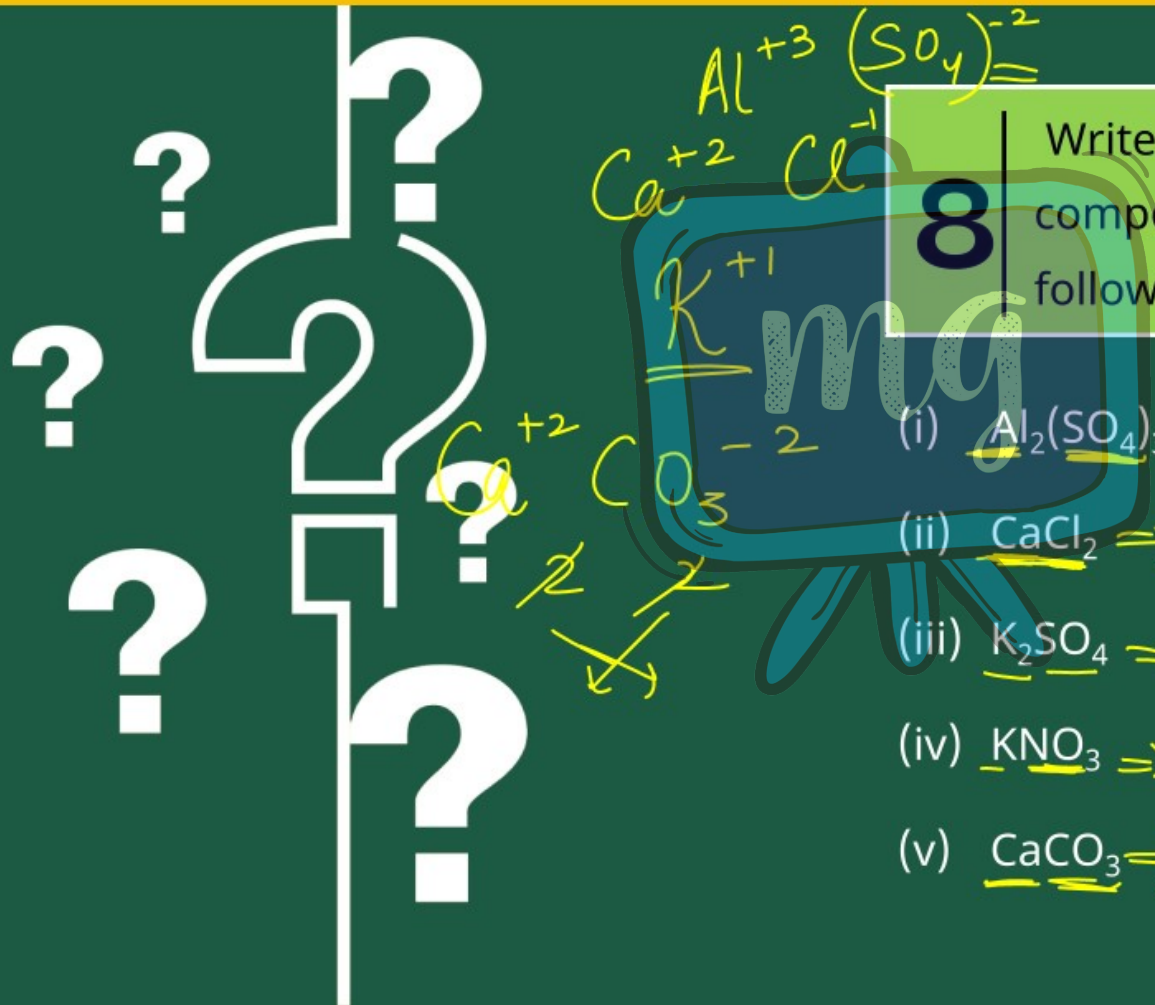
(iv) magnesium hydroxide

$Mg(OH)_2$

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8 Write down the names of compounds represented by the following formulae:

(i) $Al_2(SO_4)_3$ ⇒ Aluminium Sulphate

(ii) $CaCl_2$ ⇒ Calcium chloride

(iii) K_2SO_4 ⇒ Potassium Sulphate

(iv) KNO_3 ⇒ Potassium nitrate

(v) $CaCO_3$ ⇒ Calcium Carbonate

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9 What is meant by the term chemical formula?

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9 What is meant by the term chemical formula?

Answer :

The chemical formula of the compound is a symbolic representation of its composition, e.g., chemical formula of sodium chloride is NaCl.

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10 How many atoms are present in a —

(i) H_2S molecule and

(ii) PO_4^{3-} ion?

Answer :

(i) H_2S ⇒ 2 atoms of H & 1 atom of Sulphur Total 3 atoms

(ii) PO_4^{3-} ⇒ 1 P and 4 O

Total 1+4 = 5 atoms

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INTEXT QUESTION

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11 Calculate the molecular masses of H_2, O_2, Cl_2, CO_2, CH_4, C_2H_6, C_2H_4, NH_3, CH_3OH.

1 u 16 u 35·5 u 14 u

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INTEXT QUESTION

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11 Calculate the molecular masses of H_2, O_2, Cl_2, CO_2, CH_4, C_2H_6, C_2H_4, NH_3, CH_3OH.

Answer :

The molecular mass of H_2 – 2 × atomic mass of H = 2 × 1u = 2u

The molecular mass of O_2 – 2 × atomic mass of O = 2 x 16u = 32u

The molecular mass of Cl_2 – 2 × atomic mass of Cl = 2 × 35.5u = 71u

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INTEXT QUESTION



The molecular mass of CO_2 — atomic mass of C + 2 × atomic mass of O = 12 + (2 × 16)u = 44u

The molecular mass of CH_4 — atomic mass of C + 4 × atomic mass of H = 12 + (4 × 1)u = 16u

The molecular mass of C_2H_6 — 2 × atomic mass of C + 6 × atomic mass of H = (2 × 12) + (6 × 1)u = 24 + 6 = 30u

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The molecular mass of C_2H_4 — 2 × atomic mass of C + 4 × atomic mass of H = (2 × 12) + (4 × 1)

u = 24 + 4 = 28u

The molecular mass of NH_3 — atomic mass of N + 3 × atomic mass of H = (14 + 3 × 1)

u = 17u

The molecular mass of CH_3OH — atomic mass of C + 3x atomic mass of H + atomic mass of O + atomic mass of H = (12 + 3 × 1 + 16 + 1)

U = (12 + 3 + 17) u = 32u

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INTEXT QUESTION



12 Calculate the formula unit masses of ZnO, Na_2O, K_2CO_3, given atomic masses of Zn = 65 u, Na = 23 u, K = 39 u, C = 12 u, and O = 16 u.

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Answer :

The formula unit mass of ZnO = Atomic mass of Zn + Atomic mass of O = 65u + 16u = 81u

The formula unit mass of Na_2O = 2 × Atomic mass of Na + Atomic mass of O = (2 × 23)u + 16u = 46u + 16u = 62u

The formula unit mass of K_2CO_3 = 2 × Atomic mass of K + Atomic mass of C + 3 × Atomic mass of O = (2 × 39)u + 12u + (3 × 16)u = 138u