

Law of Conservation of Mass Chemistry Questions with Solutions

Q1. The Law of Conservation of mass was given by-

- a.) Julius Robert Mayer
- b.) Antoine Laurent Lavoisier
- c.) Dmitri Ivanovich Mendeleev
- d.) Linus Carl Pauling

Correct Answer. (b.) Antoine Laurent Lavoisier

Q2. Barium chloride reacts with sodium sulphate and forms Barium sulphate and sodium chloride. Which of the following statement is correct according to the law of conservation of mass?

- a.) The total mass of reactants, barium chloride, and sodium sulphate taken is greater than the total mass of the products, barium sulphate, and sodium chloride.
- b.) The total mass of reactants, barium chloride, and sodium sulphate taken is less than the total mass of the products, barium sulphate, and sodium chloride.
- c.) The total mass of the reactants is equal to the total mass of the products.
- d.) None of the above

Correct Answer- (c.) The total mass of the reactants is equal to the total mass of the products.

Q3. If the law of conservation of mass holds true, how much sodium chloride will react with 34.0 g of silver nitrate to produce 17 g of sodium nitrate and 28.70 g of silver chloride?

- a.) 12.35 g
- b.) 11.70 g
- c.) 9.32 g
- d.) 8.46 g

Correct Answer- (b.) 11.70 g

Q4. Another name for the law of conservation of mass is-

- a.) Law of chemical combination
- b.) Law of mass action
- c.) Law of conservation of energy.
- d.) Law of indestructibility

Correct Answer. (d.) Law of indestructibility

Q5. Why is there no mass change during chemical reactions?

Answer. Atoms are neither created nor destroyed during a chemical reaction. To form products, the atoms of the reactants are simply rearranged. As a result, there is no change in mass during a chemical reaction.

Q6. Can the law of conservation of mass be violated?

Answer. Since mass is converted into energy, nuclear reactions violate the law of conservation of mass.

Q7. What is the significance of the law of mass conservation?

Answer.

- The investigation and creation of chemical reactions.
- You can use this law to calculate the quantities of reactants and products.
- By applying the law to their laboratory practices, manufacturers can increase efficiency.

Q8. Why should the Law of conservation of mass be considered the Law of conservation of mass and energy?

Answer. The mass of the products in nuclear reactions is observed to be less than the mass of the reactants. According to Einstein's equation, $E = \Delta mc^2$, the difference in mass, known as the mass defect, is converted into energy. As a result, we should refer to it as the law of mass and energy conservation.

Q9. 4 grams of hydrogen reacts with some oxygen to make 36 grams of water. Figure out how much oxygen must have been used by applying the law of conservation of mass?

Answer. Hydrogen + Oxygen \rightarrow Water

Mass given- Hydrogen = 4g, Oxygen = x g, Water = 36 g.

According to the Law of conservation of Mass-

Mass of reactants = Mass of products

$$4 \text{ g} + x \text{ g} = 36 \text{ g}$$

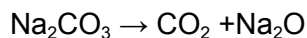
$$x \text{ g} = 36 \text{ g} - 4 \text{ g}$$

$$x = 32 \text{ g.}$$

Hence, we can say that 32 g of oxygen was used.

Q10. On heating, 10.0 grams of sodium carbonate (Na_2CO_3), 4.4 g of carbon dioxide (CO_2) and 5.6 g of sodium oxide (Na_2O) is produced. Show that this reaction obeys the law of conservation of mass.

Answer. Sodium Carbonate \rightarrow Carbon dioxide + Sodium oxide



Mass given- Sodium carbonate = 10 g, Carbon dioxide = 4.4 g, sodium oxide = 5.6 g.

According to the Law of conservation of Mass-

Mass of reactants = Mass of products

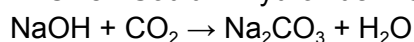
Mass of reactant = 10 g

Mass of product = 4.4 + 5.6 = 10 g.

Hence, this reaction obeys the law of conservation of mass.

Q11. How much sodium carbonate is produced when 224.4 g of NaOH reacts with 88 g of CO₂? The reaction produces 36 g of water.

Answer. Sodium Hydroxide + Carbon dioxide → Sodium carbonate + Water



Mass given- Sodium Hydroxide = 222.4 g, Carbon dioxide = 88g, Water = 36g.

Let the mass of sodium carbonate be x grams.

According to the Law of conservation of Mass-

Mass of reactants = Mass of products

Mass of Sodium Hydroxide + Mass of Carbon dioxide = Mass of Sodium carbonate + Mass of Water

$$222.4 \text{ g} + 88 \text{ g} = x \text{ g} + 36 \text{ g}$$

$$x \text{ g} = 276.4 \text{ g}$$

276.4 g of sodium carbonate is produced when 224.4 g of NaOH reacts with 88 g of CO₂ along with 36 g of water.

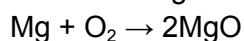
Q12. Silicon dioxide, which is composed of the elements silicon and oxygen, contains 46.7 percent silicon by mass. How much oxygen will 10 g of silicon combine with?

Answer. 100 g silicon dioxide contains 46.7 g silicon or 100 – 46.7 = 53.3 g oxygen.

This means that 10g of silicon contains $(10/100) \times 53.3 = 5.33$ g of oxygen.

Q13. 0.1618 g of magnesium oxide (MgO) was produced when 0.0976 g of magnesium was heated in the air. How much oxygen is required to produce 0.1618 g MgO?

Answer. Magnesium + Oxygen → Magnesium Oxide



Mass given- Magnesium = 0.0976 g, Magnesium oxide = 0.1618 g.

Let the mass of oxygen be x grams.

According to the Law of conservation of Mass-

Mass of reactants = Mass of products

$$0.0976 \text{ g} + x \text{ g} \rightarrow 0.1618 \text{ g}$$

$$x \text{ g} = 0.0642 \text{ g}$$

Q14. A 15.5g thin strip of iron is immersed in a solution containing 21.0g of copper (II) sulphate, and copper begins to form. After a while, the reactions come to a halt because all of the copper

(II) sulphate has reacted. The weight of the iron strip is discovered to be 8.5 g. The mass of formed copper is discovered to be 8.60g. How much iron (II) sulphate was formed in the reaction?

Answer. Mass of iron = Initial mass – Final mass

$$= 15.5 - 8.5 = 7.0\text{g}$$

Mass of copper (II) sulfate = 21.0g

Mass of copper = 8.60 g.

Let the mass of iron sulphate be x grams.

According to the law of conservation of mass,

Mass of reactants = Mass of products

Mass of iron + Mass of copper (II) sulphate = Mass of copper + Mass of iron (II) sulphate

$$7\text{ g} + 21\text{ g} = 8.6\text{ g} + x\text{ g}$$

$$x = 19.40\text{ g}$$

Therefore, 19.40 g iron (II) sulphate was formed.

Q15. What is the ultimate source of energy if it cannot be created or destroyed?

Answer. The Big Bang is the ultimate source of energy in our current universe. At the beginning of time, all energy was created, and as the universe expanded, several stages of particulate matter developed, produced from that energy. By the time of the Modern Universe, energy had been distributed as mass, kinetic energy, chemical energy in matter lumps, or radiant energy. Within the masses, galaxies and stars are classified. The sun is one of those stars, and it received its energy from the Big Bang.

Practise Questions on Law of Conservation of Mass

Q1. State the law of Conservation of mass.

Answer. It states that mass is neither created nor destroyed during a chemical reaction. As a result, the total mass of the substances prior to the reaction and the total mass of the substances after the reaction are the same.

Since there is no mass lost during the chemical reaction, the mass is conserved.

In addition, the total mass of the reactant is equal to the total mass of the product in a balanced chemical reaction.

Q2. In a chemical reaction, 300 grams of reactant A are combined with 100 grams of reactant B. Both A and B react to completion. How much will the product weigh?

- a.) 200 grams
- b.) 400 grams

- c.) 300 grams
- d.) It cannot be determined from the given information.

Correct Answer. (b.) 400 grams

Q3. I. Mass and energy are separately conserved in a reaction.

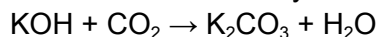
II. Law of conservation of mass and the law of conservation of energy are valid for every reaction.

- a.) I and II both are correct
- b.) I is correct and II is incorrect
- c.) I is incorrect and II is correct
- d.) I and II both are correct

Correct Answer- (d.) I and II both are correct

Q4. Potassium hydroxide (KOH) readily reacts with carbon dioxide (CO₂) to produce potassium carbonate (K₂CO₃) and water (H₂O). How many grams of potassium carbonate are produced if 224.4 g of KOH reacts with 88.0 g of CO₂? The reaction also produces 36.0 g of water.

Answer. Potassium hydroxide + carbon dioxide → potassium carbonate + water



Mass given- Potassium hydroxide 224.4 g, Carbon dioxide = 88 g, Water = 36 g.

Let the mass of potassium carbonate be x grams.

According to the law of conservation of mass,

Mass of reactants = Mass of products

$$222.4 \text{ g} + 88 \text{ g} = x \text{ g} + 36 \text{ g}$$

$$x \text{ g} = 276.4 \text{ g}$$

276.4 grams of potassium carbonate is produced.

Q5. In a reaction, 25 grams of reactant AB breaks down into 10 grams of product A and an unknown amount of product B. Using the law of conservation of mass, how much does product B weigh?

Answer. $\text{AB} \rightarrow \text{A} + \text{B}$

Mass given- Mass of AB = 25 g, Mass of A = 10 g.

Let the mass of B = x grams.

According to the law of conservation of mass,

Mass of reactants = Mass of products

$$25 \text{ g} = 10 \text{ g} + x \text{ g}$$

$$x = 15 \text{ g.}$$