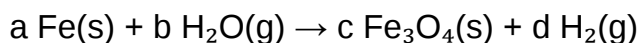


[QUESTION 1] -For the balanced chemical equation:



What are the values of the stoichiometric coefficients a, b, c, and d respectively?

A) 1, 4, 3, 4 B) 3, 4, 1, 4 C) 3, 2, 1, 2 D) 3, 4, 1, 2

[QUESTION 2] - State the law that governs the balancing of a chemical equation. Why must a skeletal chemical equation be balanced?

[QUESTION 3] -Translate the following statement into a balanced chemical equation: "Hydrogen gas combines with nitrogen gas to form ammonia gas." Identify the physical states of all reactants and products.

[QUESTION 4] - When quicklime (CaO) reacts vigorously with water, it forms slaked lime [Ca(OH)₂] along with a hissing sound and a large amount of heat. This reaction can be classified as:

A) Endothermic combination reaction B) Exothermic combination reaction
C) Endothermic decomposition reaction D) Exothermic displacement reaction

[QUESTION 5] - A student burns a magnesium ribbon in the air holding it with a pair of tongs.

(i) What is the color of the flame observed?

(ii) Write the balanced chemical equation and name the specific type of reaction.

[QUESTION 6] - Define a combination reaction. Give one fundamental example of a combination reaction involving two pure elements.

[QUESTION 7] - On heating green crystals of ferrous sulphate (FeSO₄·7H₂O), the products obtained alongside a change in color and a characteristic suffocating smell of burning sulfur are:

A) FeO, SO₂, SO₃ B) Fe₂O₃, SO₂, SO₃
C) Fe₃O₄, SO₂, H₂O D) Fe₂O₃, SO₃, H₂S

[QUESTION 8] - Why are decomposition reactions called the opposite of combination reactions? Provide one example of a photolytic decomposition reaction used in black-and-white photography.

[QUESTION 9] - List the three primary forms of energy required to break down a reactant in decomposition reactions. Give the chemical equation for the electrolytic decomposition of water.

[QUESTION 10] - What will happen when an iron nail is kept immersed in a blue-colored copper sulphate solution for about 30 minutes?

A) The solution remains blue and a green deposit settles on the nail.
B) The solution turns light green and a reddish-brown coating forms on the nail.
C) The solution turns colorless and the iron nail dissolves completely.

D) No chemical reaction takes place because iron is less reactive than copper.

[QUESTION 11] - A metal stripe 'X' is dipped into a solution of blue copper sulphate. After some time, the blue color fades, and a reddish-brown metal is deposited. If the metal 'X' is also capable of displacing hydrogen gas from dilute hydrochloric acid, identify metal 'X' and state the chemical rule governing this behavior.

[QUESTION 12] - FUNDAMENTAL-BASED (1 Mark)

Define a single displacement reaction. Write its general symbolic representation using elements A, B, and C.

[QUESTION 13] - When an aqueous solution of sodium sulphate (Na_2SO_4) is mixed with an aqueous solution of barium chloride (BaCl_2), an insoluble white substance is immediately formed. This white precipitate is:

- A) Sodium Chloride
- B) Barium Sulphate
- C) Barium Sulphide
- D) Sodium Sulphite

[QUESTION 14] - Explain why a double displacement reaction is also called a precipitation reaction in most cases. Give one example where a yellow precipitate is formed.

[QUESTION 15] - What is the fundamental difference between a single displacement reaction and a double displacement reaction?

[QUESTION 16] - In the given chemical reaction: $\text{CuO(s)} + \text{H}_2\text{(g)} \xrightarrow{\text{Heat}} \text{Cu(s)} + \text{H}_2\text{O(g)}$, identify the substance oxidized and the oxidizing agent respectively:

- A) CuO and H_2
- B) H_2 and CuO
- C) Cu and H_2O
- D) H_2O and H_2

[QUESTION 17] - In terms of electronic concepts (gain or loss of electrons), define oxidation and reduction. Identify which species undergoes oxidation in the following fundamental reaction: $\text{Mg(s)} + \text{Cl}_2\text{(g)} \rightarrow \text{MgCl}_2\text{(s)}$.

[QUESTION 18] - FUNDAMENTAL-BASED (2 Marks)

What is a Redox reaction? Identify the reducing agent in the following reaction:

