

15. DISPLACEMENT & DOUBLE DECOMPOSITION REACTIONS**SOLUTIONS****TEACHING TASK****JEE MAINS LEVEL QUESTIONS**

1. A displacement reaction will occur when...
- A) a more reactive metal displaces a less reactive metal from its compound.
 - B) A less reactive metal displaces a more reactive metal from its compound
 - C) Displacement only occurs when two of the same metals are reacted
 - D) Displacement reactions will only occur in metals above iron in the reactivity series

Answer: A

Solution: Displacement reaction Occurs when a more reactive metal displaces a less reactive metal from its compound.

2. Calcium + zinc nitrate goes to
- A) Calcium + zinc nitrate
 - B) Zinc + calcium nitrate
 - C) there will be no reaction
 - D) Zinc + calcium chloride

Answer: B

Solution: Calcium is more reactive than zinc (reactivity series: $\text{Ca} > \text{Zn}$).

So calcium displaces zinc: $\text{Ca} + \text{Zn}(\text{NO}_3)_2 \rightarrow \text{Zn} + \text{Ca}(\text{NO}_3)_2$

3. When electric current is passed through molten sodium chloride, it decomposes to give sodium metal and chlorine gas:
Which of the following is true for the above reaction?
- A) It is an electrolytic combination.
 - B) It is a chemical decomposition of a compound to form two compounds.
 - C) It is also called electrolysis of molten sodium chloride.
 - D) The above reaction is used to obtain molten sodium chloride.

Answer: C

Solution: $2\text{NaCl}(\text{molten}) \xrightarrow{\text{electricity}} 2\text{Na} + \text{Cl}_2$

It's decomposition via electricity \rightarrow electrolysis.

4. In the following chemical reaction, what product is represented by X?
- $$\text{AlCl}_3 + \text{NaOH} \rightarrow \text{X} + \text{NaCl}$$
- A) Al_3OH
 - B) It cannot be determined.
 - C) $\text{Al}(\text{OH})_3$
 - D) AlOH

Answer: C

Solution: $\text{AlCl}_3 + 3\text{NaOH} \rightarrow \text{Al}(\text{OH})_3 + 3\text{NaCl}$

5. Decreasing order of reactivity of metals:

- A) $\text{Na} > \text{Cu} > \text{Ag}$ B) $\text{Cu} > \text{Na} > \text{Zn}$ C) $\text{Na} > \text{K} > \text{Al}$ D) $\text{K} > \text{Au} > \text{Al}$

Answer: A

Solution: Reactivity series: $\text{K} > \text{Na} > \text{Ca} > \text{Mg} > \text{Al} > \text{Zn} > \text{Fe} > \text{Pb} > \text{H} > \text{Cu} > \text{Ag} > \text{Au}$

Check options:

- A) $\text{Na} > \text{Cu} > \text{Ag}$ — correct order in reactivity.
B) $\text{Cu} > \text{Na} > \text{Zn}$ — wrong (Na most reactive here).
C) $\text{Na} > \text{K} > \text{Al}$ — wrong ($\text{K} > \text{Na}$).
D) $\text{K} > \text{Au} > \text{Al}$ — wrong ($\text{Al} > \text{Au}$).

6. Based on the reactivity series provided, which of the following will react most readily with hydrochloric acid (HCl)?

- A) Magnesium (Mg)
B) Copper (Cu)
C) Lead (Pb)
D) Silver (Ag)

Answer: A

Solution: Mg is above H in the reactivity series, so it reacts readily with HCl to produce H_2 .

7. If the reaction between iron (Fe) and copper sulfate (CuSO_4) is considered, which of the following is the correct product?

- A) CuSO_4 and Fe
B) FeSO_4 and Cu
C) CuSO_4 and FeCl_2
D) FeSO_4 and CuCl_2

Answer: B

Solution: Fe more reactive than Cu: $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$

8. What can be deduced if copper (Cu) does not react with hydrochloric acid (HCl)?

- A) Copper is less reactive than hydrogen (H).
B) Copper displaces hydrogen from HCl.
C) Copper is more reactive than magnesium (Mg).
D) Copper reacts with HCl to form copper chloride and hydrogen.

Answer: A

Solution: Cu is less reactive than hydrogen.

9. In a double-displacement reaction, a precipitate is formed when:

- A) The products are gaseous compounds
B) The cations and anions form a soluble ionic compound
C) The cations from one reactant combine with the anions from the other reactant to form an insoluble ionic compound
D) The reactants dissolve completely in the solution

Answer: C

Solution: The cations from one reactant combine with the anions from the other reactant to form an insoluble ionic compound. That insoluble product is the precipitate.

10. In the reaction between potassium iodide (KI) and lead(II) nitrate ($\text{Pb}(\text{NO}_3)_2$), what is the product that forms as a precipitate?
- Potassium nitrate (KNO_3)
 - Lead iodide (PbI_2)
 - Hydrogen sulfide (H_2S)
 - Sodium chloride (NaCl)

Answer: B

Solution: $2\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow 2\text{KNO}_3 + \text{PbI}_2(\text{s})$

PbI_2 is yellow precipitate.

11. In the reaction between sodium sulfide (Na_2S) and hydrochloric acid (HCl), what is the physical state of hydrogen sulfide (H_2S)?
- Solid
 - Liquid
 - Gas
 - Aqueous

Answer: C

Solution: H_2S is a gas at room temperature.

JEE ADVANCED LEVEL QUESTIONS

MULTI CORRECT ANSWER TYPE:

12. $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ is an example for
- Displacement
 - Decomposition
 - Neutralisation
 - Double displacement reaction.

Answer: C, D

Solution: Acid (HCl) + Base (NaOH) \rightarrow Salt + Water \rightarrow Neutralisation reaction.

The exchange of ions (Na^+ with H^+) means it's also a double displacement reaction

13. Which of the following is/are precipitation reactions?
- $\text{NaCl}(\text{aq}) + \text{AgNO}_3(\text{aq}) \longrightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3(\text{aq})$
 - $\text{CuSO}_4(\text{aq}) + 2\text{NaOH}(\text{aq}) \longrightarrow \text{Cu}(\text{OH})_2(\text{s}) + \text{Na}_2\text{SO}_4(\text{aq})$
 - $\underset{\text{(Compound)}}{2\text{Al}(\text{OH})_3(\text{s})} \xrightarrow{\Delta} \underset{\text{(Compound)}}{\text{Al}_2\text{O}_3(\text{s})} + \underset{\text{(Compound)}}{3\text{H}_2\text{O}(\text{g})}$
 - $\underset{\text{(Compound)}}{2\text{Pb}(\text{NO}_3)_2(\text{s})} \xrightarrow{\Delta} \underset{\text{(Compound)}}{2\text{PbO}(\text{s})} + \underset{\text{(Compound)}}{4\text{NO}_2(\text{g})} + \underset{\text{(Element)}}{\text{O}_2(\text{g})}$

Answer: A, B

Solution: A) $\text{NaCl}(\text{aq}) + \text{AgNO}_3(\text{aq}) \longrightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3(\text{aq})$

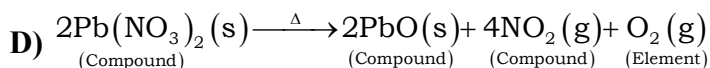
$\text{AgCl}(\text{s})$ is an insoluble solid \rightarrow Precipitation reaction

B) $\text{CuSO}_4(\text{aq}) + 2\text{NaOH}(\text{aq}) \longrightarrow \text{Cu}(\text{OH})_2(\text{s}) + \text{Na}_2\text{SO}_4(\text{aq})$

$\text{Cu}(\text{OH})_2(\text{s})$ is insoluble \rightarrow Precipitation reaction

C) $\underset{\text{(Compound)}}{2\text{Al}(\text{OH})_3(\text{s})} \xrightarrow{\Delta} \underset{\text{(Compound)}}{\text{Al}_2\text{O}_3(\text{s})} + \underset{\text{(Compound)}}{3\text{H}_2\text{O}(\text{g})}$

Thermal decomposition, not precipitation



Thermal decomposition, not precipitation

STATEMENT TYPE:

- A) Statement-I, is True, Statement - II is True; Statement - II is a correct explanation for Statement-I
 B) Statement - I is True, Statement is True; Statement -II is NOT a correct explanation for Statement - I
 C) Statement - I is True, Statement - II , is False
 D) Statement - I is False, Statement - II is True
14. **Statement-I** : $\text{Fe} + \text{CuSO}_4(\text{aq}) \rightarrow \text{FeSO}_4(\text{aq}) + \text{Cu}$ is displacement reaction.
Statement-II : More reactive element displaces less reactive element from its aqueous salt solution is called Displacement reaction.

Answer:A

Solution:

Statement-I: $\text{Fe} + \text{CuSO}_4(\text{aq}) \rightarrow \text{FeSO}_4(\text{aq}) + \text{Cu}$ is a displacement reaction \rightarrow (True)

Statement-II: A more reactive element displaces a less reactive element from its aqueous salt solution is called a displacement reaction \rightarrow (True)

Here Fe (more reactive) displaces Cu (less reactive).

15. **Statement-I** : Acid base reactions are double displacement reaction which are also called as neutralization reactions.
Statement-II : Hydrogen ion (H^+) from acid and hydroxyl ions (OH^-) from base combine to form salt and water.

Answer:C

Solution:

Statement I is correct, as acid-base reactions are a type of double displacement reaction and are called neutralization reactions.

Statement II is incorrect because while hydrogen ions H^+ and hydroxyl ions OH^- combine to form water, the salt is formed from the remaining cation of the base and the anion of the acid, not by the H^+ and OH^- ions themselves.

COMPREHENSION TYPE:

Comprehension - I

A more reactive element displaces less reactive element from its aqueous salt solution is called displacement reaction.

16. $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{X} + \text{NaNO}_3$. Identify X
 A) NaN B) AgCl C) AgN D) NaO

Answer:B

Solution: This is a double displacement reaction: $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3$
 AgCl is insoluble (white precipitate).

So $X = \text{AgCl}$.

17. A teacher performed the following experiment. He took a strip of lead metal and placed in a solution of copper chloride. Which of the following is the correct equation for the above reaction?

- A) $\text{Cu}_2\text{Cl} + \text{Pb} \longrightarrow \text{PbCl}_2 + 2\text{Cu}$
 B) $\text{CuSO}_4 + \text{Pb} \longrightarrow \text{PbSO}_4 + \text{Cu}$
 C) $\text{CuCl}_2 + \text{Pb} \longrightarrow \text{PbCl}_2 + \text{Cu}$
 D) $\text{Cu}_2\text{Cl}_2 + 2\text{Pb} \longrightarrow \text{PbCl}_2 + \text{Cu}$

Answer: C

Solution: Copper chloride is CuCl_2 (common form for this reaction).

Lead is more reactive than copper, so: $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$

Comprehension - II

The reactions where chemical change takes place is called chemical reaction. There are 4 types of chemical reactions. A chemical reaction, in which two compounds in their aqueous solution react by exchanging their radicals, is called chemical double-decomposition or chemical double-displacement.

18. $\text{CuSO}_4 + \text{Zn} \rightarrow X + \text{Cu}$. What is x?

- A) CuS B) ZnS C) ZnSO_4 D) ZnSO_3 .

Answer: C

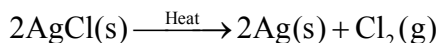
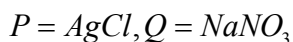
Solution: This is a displacement reaction: Zn is more reactive than Cu, so Zn displaces Cu from CuSO_4 : $\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$

19. i) $\text{AgNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{P} + \text{Q}$ ii) $\text{PCl}_5(\text{s}) \xrightleftharpoons[\text{Cool}]{\text{Heat}} \text{R} + \text{S}$

- | | P | Q | R | S |
|----|-----------------|-----------------|-----------------|-----------------|
| A) | AgCl | NaNO_3 | PCl_3 | Cl_2 |
| B) | NaNO_3 | PCl_3 | Cl_2 | AgCl |
| C) | AgCl | PCl_3 | NaNO_3 | Cl_2 |
| D) | AgCl | PCl_3 | Cl_2 | NaNO_3 |

Answer: A

Solution:



INTEGER TYPE:

20. Among Na, Ag, Zn, Pt how many are more reactive than iron?

Answer: 2

Solution: Reactivity series (part): $\text{Na} > \text{Zn} > \text{Fe} > (\text{H}) > \text{Cu} > \text{Ag} > \text{Pt}$

Na — more reactive
 Ag — less reactive
 Zn — more reactive
 Pt — less reactive
 So 2 metals are more reactive than iron.

21. Among K, Zn, Al, Cu, Sn how many metals cannot displace magnesium from magnesium sulphate?

Answer: 3

Solution: Reactivity: $K > (\text{very reactive}) > Al > Zn > (Mg) > Sn > (H) > Cu$

Only metals above Mg in reactivity series can displace Mg from $MgSO_4$.

K — above Mg → can displace

Zn — below Mg → cannot displace

Al — above Mg → can displace

Cu — below Mg → cannot displace

Sn — below Mg → cannot displace

Cannot displace: Zn, Cu, Sn → 3 metals

MATRIX MATCHING TYPE:

22. COLUMN -I

A) $CuSO_4 + Fe$

B) $C + O_2 \rightarrow CO_2$

C) $NaOH + HCl \rightarrow NaCl + H_2O$

D) $AgNO_3 + NaCl \rightarrow NaNO_3 + AgCl$

COLUMN-II

1. combination

2. Neutralisation

3. Precipitation reaction

4. $FeSO_4 + Cu$.

Answer: A-4, B-1, C-2, D-3

Solution: A) $CuSO_4 + Fe$

B) $C + O_2 \rightarrow CO_2$

C) $NaOH + HCl \rightarrow NaCl + H_2O$

D) $AgNO_3 + NaCl \rightarrow NaNO_3 + AgCl$

4. $FeSO_4 + Cu$.

1. combination

2. Neutralisation

3. Precipitation reaction

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

1. When a more reactive element displaces less reactive element from its aqueous salt solution is called...

A) Combination reaction

B) Decomposition reaction

C) Displacement reaction

D) Double displacement reaction.

Answer: C

Solution: More reactive element displaces less reactive element from aqueous salt solution → Displacement reaction.

2. When two chemical compounds in their aqueous state exchange ions such that one of the product is precipitate is called...

A) Precipitation reaction

B) Decomposition reaction

C) Displacement reaction

D) Neutralisation reaction

Answer:A

Solution: Two aqueous compounds exchange ions → one product is precipitate → Precipitation reaction.

3. Among the following types of chemical reactions, application of metal reactivity series is involved with which reaction?

A) Combination reaction

B) Decomposition reaction

C) Displacement reaction

D) Double displacement reaction.

Answer:C

Solution: Metal reactivity series is used in Displacement reactions to predict if a reaction occurs.

4. What is a displacement reaction?

A) A reaction in which a more reactive element displaces a less reactive element from its aqueous salt solution.

B) A reaction where two compounds exchange radicals.

C) A reaction that produces a precipitate.

D) A reaction where water is formed.

Answer:A

Solution: Definition of displacement reaction: more reactive element displaces less reactive element from aqueous salt solution.

5. What is a metal displacement reaction?

A) A reaction in which a metal is displaced from a compound.

B) A reaction where a metal reacts with an acid to replace hydrogen.

C) A reaction where halogens replace each other.

D) A reaction between two aqueous solutions to form a precipitate.

Answer:A

Solution: Metal displacement reaction: a metal is displaced from its compound by a more reactive metal.

6. In a hydrogen replacement reaction, which element is replaced by an active metal?

A) Oxygen

B) Hydrogen

C) Carbon

D) Chlorine

Answer:B

Solution: Hydrogen replacement reaction: active metal replaces hydrogen from acid/water.

7. What is a halogen displacement reaction?

A) A reaction where a halogen is displaced from a compound.

B) A reaction in which a metal replaces hydrogen in an acid.

C) A reaction that results in the formation of a precipitate.

D) A reaction where two compounds exchange ions.

Answer:A

Solution: Halogen displacement reaction: a more reactive halogen displaces a less reactive halogen from its compound.

8. What type of product is usually formed in a double displacement reaction?

- A) A solid precipitate
- B) A gas
- C) A molecular compound such as water
- D) All of the above

Answer:D

Solution: Double displacement reaction products: can be precipitate, gas, or water (neutralization).

9. In which type of reaction does water typically form as one of the products?

- A) Displacement reaction
- B) Neutralization reaction
- C) Decomposition reaction
- D) Combination reaction

Answer:B

Solution: Water forms in Neutralization reaction (acid + base).

10. What is the correct reactivity order of metals according to the given information?

- A) $K > Na > Ca > Mg > Al > Zn > Fe > Pb > [H] > Cu > Hg > Ag > Au$
- B) $Na > K > Ca > Mg > Al > Zn > Fe > Pb > [H] > Cu > Hg > Ag > Au$
- C) $Ca > K > Na > Mg > Al > Zn > Fe > Pb > [H] > Cu > Hg > Ag > Au$
- D) $K > Na > Fe > Mg > Ca > Al > Zn > Cu > Hg > Pb > [H] > Ag > Au$

Answer:A

Solution: Correct reactivity order: $K > Na > Ca > Mg > Al > Zn > Fe > Pb > [H] > Cu > Hg > Ag > Au$

JEE MAINS LEVEL QUESTIONS

1. Which of the following statements is true about a single-displacement reaction?

- A) A single-displacement reaction occurs when one element replaces another element of the same charge.
- B) In a single-displacement reaction, a more reactive element replaces a less reactive element in a compound.
- C) In a single-displacement reaction, both the reactants and the products are always metals.
- D) A single-displacement reaction requires no energy input to occur.

Answer:B

Solution: A more reactive element replaces a less reactive element in a compound.

2. Which one of the following would the following result in a displacement reaction?

- A) Iron with magnesium chloride B) magnesium with iron chloride
C) Iron with Zinc Sulphate D) Gold with silver nitrate

Answer: B

Solution: A) Fe with $\text{MgCl}_2 \rightarrow$ No (Fe less reactive than Mg)

B) Mg with $\text{FeCl}_2 \rightarrow$ Yes (Mg more reactive than Fe)

C) Fe with $\text{ZnSO}_4 \rightarrow$ No (Fe less reactive than Zn)

D) Au with $\text{AgNO}_3 \rightarrow$ No (Au less reactive than Ag)

3. What is made when magnesium reacts with hydrochloric acid?

- A) Magnesium nitrate and hydrogen gas
B) Magnesium sulfate and hydrogen gas
C) Magnesium oxide and oxygen gas
D) Magnesium chloride and hydrogen gas

Answer: D

Solution: Magnesium + hydrochloric acid \rightarrow Magnesium chloride + hydrogen gas.

4. Which of the following will not undergo reaction?

- A) Zinc metal + zinc oxide B) Iron metal + copper oxide
C) Zinc metal + iron oxide D) Magnesium + iron oxide

Answer: A

Solution: A) $\text{Zn} + \text{ZnO} \rightarrow$ No reaction (same element, no displacement)

B) $\text{Fe} + \text{CuO} \rightarrow$ Fe can displace Cu (yes, reaction)

C) $\text{Zn} + \text{FeO} \rightarrow$ Zn more reactive than Fe \rightarrow yes

D) $\text{Mg} + \text{FeO} \rightarrow$ Mg more reactive than Fe \rightarrow yes

5. $\text{Zn} + 2\text{HCl} \rightarrow \text{H}_2 + \text{ZnCl}_2$ is reaction.

- A) Combination B) Decomposition
C) Displacement D) Double displacement.

Answer: C

Solution: $\text{Zn} + 2\text{HCl} \rightarrow \text{H}_2 + \text{ZnCl}_2 \rightarrow$ More reactive Zn displaces H from acid \rightarrow Displacement.

6. The chemical equation, $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$, is an example of which type of reaction?

- A) double-replacement B) combustion
C) decomposition D) single-replacement

Answer: C

Solution: $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2 \rightarrow$ One reactant \rightarrow two or more products \rightarrow Decomposition

7. If zinc (Zn) reacts with hydrochloric acid, which product would NOT be formed?

- A) Zinc chloride (ZnCl_2)
B) Hydrogen gas (H_2)
C) Copper chloride (CuCl_2)
D) Both zinc chloride (ZnCl_2) and hydrogen gas (H_2)

Answer: C

Solution: $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
 CuCl_2 not formed.

8. Given the reactivity series ($\text{Li} > \text{K} > \text{Na} > \text{Ca} > \text{Mg} > \text{Al} > \text{Zn} > \text{Fe} > \text{Pb} > \text{Sn} > [\text{H}] > \text{Cu} > \text{Hg} > \text{Ag} > \text{Au} > \text{Pt}$), which of the following pairs would result in a single-displacement reaction?
- A) Cu and HCl
 - B) Fe and CuSO_4
 - C) Mg and NaCl
 - D) Au and AgNO_3

Answer: B

Solution: A) $\text{Cu} + \text{HCl} \rightarrow$ No (Cu below H)
B) $\text{Fe} + \text{CuSO}_4 \rightarrow$ Yes (Fe above Cu)
C) $\text{Mg} + \text{NaCl} \rightarrow$ No (Mg is less reactive than Na, so no displacement)
D) $\text{Au} + \text{AgNO}_3 \rightarrow$ No (Au below Ag)

9. Which of the following is a product in the double-displacement reaction between sodium sulfide (Na_2S) and hydrochloric acid (HCl)?
- A) Water (H_2O)
 - B) Hydrogen sulfide (H_2S)
 - C) Potassium iodide (KI)
 - D) Sodium nitrate (NaNO_3)

Answer: B

Solution: $\text{Na}_2\text{S} + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{S}$ (gas) \rightarrow Product: H_2S .

10. When aqueous sodium hydroxide (NaOH) reacts with hydrochloric acid (HCl), what are the products formed?
- A) Sodium chloride (NaCl) and hydrogen sulfide (H_2S)
 - B) Sodium chloride (NaCl) and water (H_2O)
 - C) Potassium chloride (KCl) and water (H_2O)
 - D) Sodium sulfate (Na_2SO_4) and water (H_2O)

Answer: B

Solution: $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$.

11. Which of the following products is typically formed in double-displacement reactions involving gases?
- A) Precipitates
 - B) Soluble salts
 - C) Molecular compounds
 - D) Gaseous products

Answer: D

Solution: Double-displacement reactions can produce gases (e.g., carbonates + acid $\rightarrow \text{CO}_2$, sulfides + acid $\rightarrow \text{H}_2\text{S}$).

JEE ADVANCED LEVEL QUESTIONS

MULTI CORRECT ANSWER TYPE:

12. $(A^+ B^-) + (C^+ D^-) \rightarrow (A^+ D^-) + (C^+ B^-)$ represents:
- Chemical displacement
 - Chemical double displacement reaction.
 - Chemical double decomposition reaction.
 - Chemical combination.

Answer: B, CSolution: $(A^+ B^-) + (C^+ D^-) \rightarrow (A^+ D^-) + (C^+ B^-)$

Here, the positive ions (cations) and negative ions (anions) exchange partners between two compounds.

That means it is a double displacement (also called double decomposition) reaction

STATEMENT TYPE:

- Statement-I, is True, Statement - II is True; Statement - II is a correct explanation for Statement-I
 - Statement - I is True, Statement is True; Statement -II is NOT a correct explanation for Statement - I
 - Statement - I is True, Statement - II , is False
 - Statement - I is False, Statement - II is True
13. **Statement-I :** In a double-displacement reaction, when sodium sulfide and hydrochloric acid are mixed, hydrogen sulfide gas is produced.
- Statement-II:** The product hydrogen sulfide (H_2S) is dissolved in the solution in this reaction.

Answer: C

Solution: Statement-I: True

$$Na_2S + 2HCl \rightarrow 2NaCl + H_2S$$
— Hydrogen sulfide gas is indeed produced.

Statement-II: False

H_2S is a gas that escapes (it is not dissolved in the solution; it bubbles out)

14. **Statement-I :** In the reaction between hydrochloric acid and sodium hydroxide, water is formed as a product.
- Statement-II:** The reaction between hydrochloric acid and sodium hydroxide is an example of a double displacement reaction.

Answer: A

Solution: Statement-I: True

$$HCl + NaOH \rightarrow NaCl + H_2O$$
— Water is formed.

Statement-II: True — Acid-base neutralization is a double-displacement reaction (exchange of ions: H^+ and OH^-)

COMPREHENSION TYPE:

Comprehension-I:

A more reactive element displaces less reactive element from its aqueous salt solution is called displacement reaction.

15. $A + BC \rightarrow AC + B$ is reaction .
- Combination
 - Decomposition

C) Displacement

D) Double displacement.

Answer: C

Solution: In the reaction $A + BC \rightarrow AC + B$, the element A replaces B from its compound BC.

That means a more reactive element displaces a less reactive element — this is a single displacement (or substitution) reaction.

Comprehension-II:

A metal displacement reaction occurs when a more reactive metal displaces a less reactive metal from a compound. For example, when magnesium metal is placed in an aqueous solution of copper (II) nitrate, magnesium replaces copper, forming magnesium nitrate and copper metal. Another type of displacement reaction is a hydrogen replacement reaction, where an active metal replaces hydrogen from an acid, releasing hydrogen gas. For instance, zinc reacts with hydrochloric acid to form zinc chloride and hydrogen gas. Some metals, like sodium, react with water to produce metal hydroxide and hydrogen gas. Finally, a halogen displacement reaction happens when a more reactive halogen replaces a less reactive halogen from a compound. For example, chlorine can replace bromine in sodium bromide to form sodium chloride and bromine gas.

16. Which metal is involved in the metal displacement reaction with copper (II) nitrate?

- A) Zinc B) Magnesium C) Sodium D) Calcium

Answer: A, B, C, D

Solution: All four are more reactive than copper, so each can displace Cu from $\text{Cu}(\text{NO}_3)_2$

17. Which metal reacts vigorously with water in a hydrogen replacement reaction?

- A) Zinc B) Magnesium C) Sodium D) Copper

Answer: C

Solution: Sodium reacts violently with water to form NaOH and H_2 gas

18. In a halogen displacement reaction, what does chlorine replace when it reacts with sodium bromide?

- A) Sodium B) Hydrogen C) Bromine D) Oxygen

Answer: C

Solution: $\text{Cl}_2 + 2\text{NaBr} \rightarrow 2\text{NaCl} + \text{Br}_2$

Chlorine is more reactive than bromine, so it displaces Br_2 from NaBr

INTEGER TYPE:

19. Double displacement reactions are of types.

Answer: 3

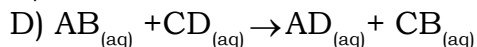
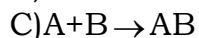
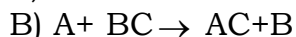
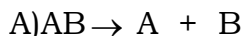
Solution: Double displacement reactions are of three main types: precipitation, neutralization, and gas formation.

20. How many products are formed during combination reaction?

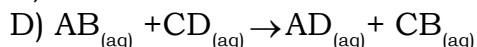
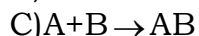
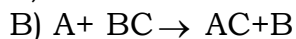
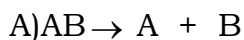
Answer: 1

Solution: A combination reaction is when two or more reactants combine to form a

single product.

MATRIX MATCHING TYPE:**21. COLUMN -I****Answer: A-2, B-1, C-4, D-3**

Solution:

**COLUMN-II**

1) displacement

2) decomposition

3) double displacement

4) Combination

2) decomposition

1) displacement

4) Combination

3) double displacement

KEY

TEACHING TASK									
JEE MAINS&ADVANCED LEVEL QUESTIONS									
1	2	3	4	5	6	7	8	9	10
A	B	C	C	A	A	B	A	C	B
11	12	13	14	15	16	17	18	19	20
C	C,D	A,B	A	C	B	C	C	A	2
21	22								
3 A-4,B-1,C-2,D-3									
LEARNERS TASK									
CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)									
1	2	3	4	5	6	7	8	9	10
C	A	C	A	A	B	A	D	B	A
JEE MAINS&ADVANCED LEVEL QUESTIONS									
1	2	3	4	5	6	7	8	9	10
B	B	D	A	C	C	C	B	B	B
11	12	13	14	15	16	17	18	19	20
D	B,C	C	A	C	A,B,C,D	C	C	3	1
21									
A-2, B-1, C-4, D-3									

EdOS