Chemistry Practical Class 9 - To carry out the reaction of Iron with copper sulphate solution in water and classify it as physical or chemical changes - Viva Questions with Answers

Q1. Define Physical Changes.

Answer. A physical change occurs when there is no change in the composition of a substance and no change in the chemical nature of the substance.
The interconversion of state occurs during physical change.

SOLID ⇄ LIQUID ⇄ GAS

Q2. Define Chemical Changes.

Answer. It is a change that causes a change in the chemical properties of matter, resulting in the formation of a new substance. As an example, consider the burning of oil or fuel.
Heat is evolved or taken in, the formation of bubbles, gas, and fumes, as well as a change in the colour of the reactants, can take place when they form a product.

Reactants → Products
A + B → C (Chemical reaction)

Q3. What is a Chemical Reaction?

Answer. A chemical reaction is a chemical change in which the bonds are broken within reactant molecules, and new bonds are formed within product molecules in order to form a new substance. A chemical reaction can be represented by a chemical equation, which specifies the number and type of atoms involved, as well as their arrangement into molecules or ions. The element symbols are used as a shorthand notation for the elements in a chemical equation, with arrows indicating the direction of the reaction.

Q4 How many types of chemical reactions are there?

Answer. There are 4 types of chemical reactions. They are as follows-

- Combination Reaction
- Decomposition Reaction
- Displacement Reaction
- Double Displacement Reaction

Q5. Define Combination reaction.

Answer. A reaction in which two or more reactants combine to form a single product is known as a combination reaction. It takes the form of $X + Y \rightarrow XY$
A combination reaction is also known as a synthesis reaction.
Example of combination reaction: $2Na + Cl_2 \rightarrow 2NaCl$

Q6. Define Decomposition Reaction.

Answer. A reaction in which a single compound breaks into two or more simpler compounds is known as a decomposition reaction.
It takes the form of $XY \rightarrow X + Y$
A decomposition reaction is just the opposite of a combination reaction.
Example of a decomposition reaction: $CaCO_3 \rightarrow CaO + CO_2$

Q7. Define Displacement Reaction.

Answer. A chemical reaction in which a more reactive element displaces a less reactive element from its aqueous salt solution. It takes the form $X + YZ \rightarrow XZ + Y$
It is also called a substitution reaction
Example of displacement reaction: $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

Q8. Define Double Displacement Reaction.

Answer. A chemical reaction in which ions get exchanged between two reactants which form a new compound is called a double displacement reaction. It takes the form of $XY + ZA \rightarrow XZ + YA$
It is also called a metathesis reaction
Example of a double displacement reaction:
$BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$.

Q9. What is the formula of Iron?

Answer. The formula of iron is Fe.

Q10. What is the formula of Copper sulphate?

Answer. The formula of Copper Sulphate is $CuSO_4$.

Q11. What is the colour of copper sulphate solution?

Answer. The colour of the copper sulphate solution is blue.

Q12. Why are iron nails rubbed with sand paper?

Answer. Iron nails are rubbed with sandpaper so as to remove any impurities present like rust, dust or greasy surface.

Q13. Does the colour of the copper sulphate solution changes?

Answer. Yes, the colour of the copper sulphate solution changes from blue to light greenish.

Q14. Does the colour of the iron nails change?

Answer. Yes, the colour of the iron nails changed from grey to reddish-brown.

Q15. Why is there a change in colour observed?

Answer. Since iron is more reactive than copper, when an iron nail is immersed in a copper sulphate solution, iron displaces copper from the solution. As a result, the colour change is visible.

Q16. What does the greenish colour of the solution show?

Answer. The greenish colour of the solution shows that Fe^{2+} Ions are present in the solution.

Q17. What does the brown coating on the iron nails show?

Answer. The brown coating in the iron nail shows that copper is deposited in it by displacing iron.

Q18. Is the reaction a chemical change or a physical change?

Answer. The reaction is a chemical change because new products are formed.

Q19. What type of reaction is it?

Answer. This reaction is an example of a single displacement reaction, where copper has been displaced by iron from the solution, forming a new compound ferrous sulphate.

Q20. Give the equation for the reaction.

Answer. The equation for the reaction is-
$Fe\ (s) + CuSO_4\ (aq) \rightarrow FeSO_4\ (aq) + Cu\ (s)$

Q21. State some precautions that need to be taken while performing the experiment.

Answer. Some precautions that need to be followed while performing the experiments are as follows-

- Using sandpaper, thoroughly clean the iron nail.

- Copper sulphate solution is poisonous, so use caution when handling it.
- The test tubes should not be touched or disturbed during the experiment.
- After completing the experiment, the copper-coated iron nail should not be touched.