



**CREST**  
*Olympiads*  
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# CREST Science Olympiad (CSO) Worksheet *for*

**Class 10**



**Topic**

**Salts and Other Important Compounds**



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## Worksheet on Salts and Other Important Compounds

- In a laboratory experiment, you add a few drops of hydrochloric acid (HCl) to a solution containing an unknown salt. If the solution fizzes and produces carbon dioxide gas, what can you conclude about the unknown salt?**
  - It is an acidic salt.
  - It is a basic salt.
  - It is a neutral salt.
  - It is a salt with carbonate ions.
- In the industrial production of sodium hydroxide by electrolysis of sodium chloride solution, what are the key reactions occurring at the anode and cathode, and how do these reactions contribute to the formation of sodium hydroxide?**
  - At the anode, chlorine gas is produced, and at the cathode, sodium ions react with water to form sodium hydroxide.
  - At the anode, sodium ions migrate to react with chloride ions, forming sodium chloride, which is then converted to sodium hydroxide.
  - At the cathode, sodium metal is formed, and at the anode, water is electrolysed to produce hydroxide ions that combine with sodium ions to yield sodium hydroxide.
  - At the cathode, hydrogen gas is evolved, and at the anode, chlorine ions are oxidised to form sodium hydroxide.
- You perform an experiment to determine the water content in a sample of hydrated copper sulphate ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ). After heating, you measure the mass of the anhydrous copper sulphate ( $\text{CuSO}_4$ ). If the initial mass of the hydrated sample was 10 grams, and the final mass of the anhydrous sample is 7 grams, what percentage of water was present in the hydrated sample?**
  - 20%
  - 30%
  - 40%
  - 50%
- You want to create a chemical hot pack for camping that generates heat when needed. Which salt would you choose as the main component of the pack, and why does it release heat when activated?**
  - Sodium chloride, because it absorbs moisture from the air.
  - Sodium hydroxide, because it undergoes an exothermic reaction with water.
  - Calcium carbonate, because it reacts with air to produce heat.
  - Sodium bicarbonate, because it absorbs heat from the surroundings.

**5. How does the solubility of salts in water relate to their ability to conduct electricity when dissolved?**

- a. Highly soluble salts conduct electricity better.
- b. Less soluble salts conduct electricity better.
- c. Solubility and conductivity are unrelated.
- d. Salts do not conduct electricity in water.

## Answer Key

1. d - When the addition of hydrochloric acid (HCl) to a solution produces fizzing and the release of carbon dioxide gas (CO<sub>2</sub>), it indicates the presence of carbonate ions (CO<sub>3</sub><sup>2-</sup>) in the unknown salt. Carbonate ions react with hydrochloric acid to form carbon dioxide gas, which is a classic test for the carbonate ion.

2. a - In the industrial production of sodium hydroxide by the electrolysis of sodium chloride solution, chlorine gas is produced at the anode, and sodium ions react with water at the cathode to form sodium hydroxide. This process is known as the chlor-alkali process and is a well-established method for producing sodium hydroxide, chlorine gas, and hydrogen gas.

3. b - Given:

Initial mass of hydrated sample = 10 grams

Final mass of anhydrous sample = 7 grams

To find the percentage of water, you can use the formula:

Percentage of water = [(Initial mass - Final mass of anhydrous sample) / Initial mass] × 100

Percentage of water = [(10 g - 7 g) / 10 g] × 100

Percentage of water = (3 g / 10 g) × 100

Percentage of water = 0.3 × 100

Percentage of water = 30%

4. b - Sodium hydroxide (NaOH) is the most suitable choice for a chemical hot pack that generates heat when needed. This is because sodium hydroxide undergoes an exothermic reaction when it reacts with water. The reaction between sodium hydroxide and water is highly exothermic, meaning it releases a significant amount of heat energy. The released heat can be used to warm up the pack, providing a source of heat for camping or other purposes.

5. a - Solubility and the ability to conduct electricity in water are closely related. When salts dissolve in water, they dissociate into their constituent ions. Ionic compounds, like salts, consist of positively charged ions (cations) and negatively charged ions (anions). In an aqueous solution, these ions become mobile and can carry electric charges, making the solution conductive.

Highly soluble salts readily dissociate into a large number of ions in water, resulting in a higher concentration of mobile ions. As a result, the solution conducts electricity effectively. Conversely, less soluble salts do not dissociate as extensively, leading to a lower concentration of mobile ions and lower electrical conductivity.

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