



**CHAPTER 7**  
**MATERIALS OF COMMON USE**

**TEXTUAL QUESTIONS & ANSWERS**

*(Let us answer the following) – Page No. 135*

**1. Why does bleaching powder act as a disinfectant?**

**Ans:** Chlorine liberated from Bleaching powder can kill germs. So, bleaching powder acts as a disinfectant.

**2. Why does bleaching powder act as a bleaching agent?**

**Ans:** Chlorine liberated from Bleaching powder can bleach colours. So, bleaching powder acts as a bleaching agent.

*(Let us answer these) – Page No. 141*

**1. Why are beating, scrubbing or agitation required while washing clothes?**

**Ans:** Molecules of soap form micelles with dirt, such as grease. Micelles remain suspended as colloid. To remove dirt in the form of micelles from clothes agitation is necessary to get clean clothes.

**2. Devise a simple method for detection of hard or soft water.**

**Ans:** If bubbles are readily produced when we used soap in the given water, the given water is soft water.

If bubbles are not produced easily when we used soap in the given water, the given water is Hard water.

**3. Can detergent be used to detect hard water?**

**Ans:** Detergent cannot be used to detect hard water.



*Textual Exercises – Page No. 142*

1. **How is pure sodium chloride obtained from the impure salt?**

**Ans:** Pure Sodium Chloride is prepared by passing hydrochloric acid gas into a saturated solution of impure salt.

2. **What is the product obtained by reacting NaOH with HCl?**

**Ans:** Sodium Chloride (NaCl) and Water (H<sub>2</sub>O).

3. **How is Freezing mixture made?**

**Ans:** Freezing mixture is made by mixing common salt with Ice.

4. **Give important uses of sodium chloride?**

**Ans:**

(i) Common salt gives a characteristic flavour to food.

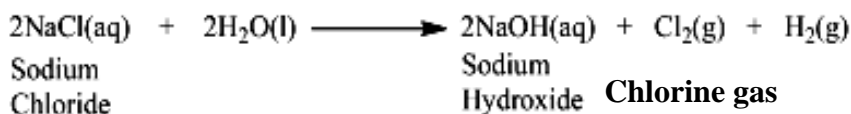
(ii) It is used in preserving fish, meat, pickles etc.

(iii) It is used for salting out of soap, regenerating water softeners and in the “Salt glazing” of

(iv) Earthen wares.

5. **Name the products obtained when aqueous sodium chloride electrolysed.**

**Ans:**



6. **What are the main uses of Chlorine?**

**Ans:** Chlorine is used for sterilizing water, in swimming pools; manufacture of PVC (Polyvinyl chloride) plastics, pesticides and CFC (Chloroflouro Carbon).



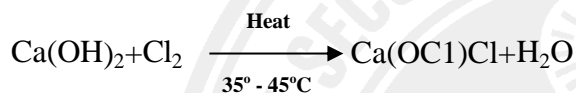
7. What is the use of Sodium hypochlorite?

Ans:

- Sodium hypochlorite solution is the basic ingredient of all commercial bleaching solutions sold in the market.
- It is used to remove ink stains.
- It is used in bleaching clothes.

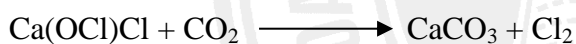
8. How is bleaching powder prepared?

Ans: Bleaching powder is prepared by passing  $\text{Cl}_2$  gas over dry slaked lime at  $35^\circ\text{C} - 45^\circ\text{C}$ .



9. How does bleaching powder decompose in moist air?

Ans: When Bleaching powder is decomposed in moist air, it produces Chlorine gas as a main product.



10. Give the important use of Bleaching powder.

Ans:

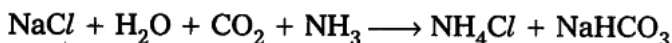
- It is used as a disinfectant and for sterilizing water to make water free from disease causing germs
- and bacteria.
- It is used for bleaching pulp in paper industry, linen and cotton in textile industry.
- It is used as an oxidizing agent in chemical industries.

11. Give a method for obtaining Sodium hydrogen Carbonate.

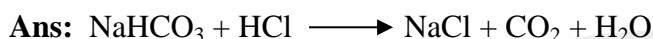
Ans: When an excess of carbon dioxide is bubbled through a nearly saturated solution of common salt containing ammonia, ammonium hydrogen carbonate is formed which then reacts



with more of sodium chloride forming sparingly soluble sodium hydrogen carbonate and ammonium chloride



12. What happens when  $\text{NaHCO}_3$  reacts with dil  $\text{HCl}$ ?



When  $\text{NaHCO}_3$  reacts with dil  $\text{HCl}$ , Sodium Chloride ( $\text{NaCl}$ ), Carbon Dioxide ( $\text{CO}_2$ ) and water ( $\text{H}_2\text{O}$ ) are formed.

13. What is salt cake?

**Ans:** Salt cake is chemically Sodium sulphate ( $\text{Na}_2\text{SO}_4$ ). It is formed when  $\text{NaCl}$  reacts with  $\text{H}_2\text{SO}_4$ .

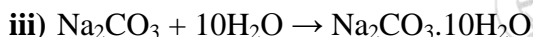
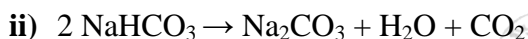


Salt Cake

14. Describe Solvay Process.

**Ans:** Washing soda is synthesized through *Solvay's process*. Solvay's process involves the reaction of sodium chloride, ammonia and carbon dioxide in water. Carbon dioxide involved is produced through calcium carbonate and the calcium oxide left is used in recovering ammonia from ammonium chloride.

At first, sodium bicarbonate is obtained which is then converted to sodium carbonate on heating. Finally, washing soda is produced by recrystallization of sodium carbonate.



15. What is the colour of anhydrous copper sulphate?

**Ans:** Colourless.

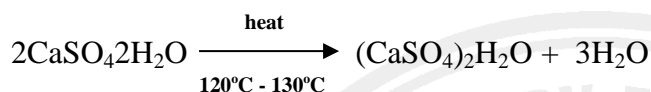


**16. What are Green Vitriol and blue vitriol?**

**Ans:** Green vitriol is Ferrous sulphate ( $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ ), Blue Vitriol is Crystalline Copper Sulphate ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ).

**17. How is Plaster of paris made?**

**Ans:** Plaster of paris is prepared by heating Gypsum at  $120^\circ\text{C}$ - $130^\circ\text{C}$ .



The setting of Plaster of paris is due to the reformation of gypsum with the absorption of water.

**18. What is the difference between Soap and detergents?**

**Ans:**

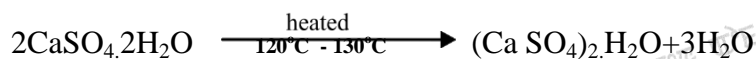
**DIFFERENCES**

<b>SOAP</b>	<b>DETERGENT</b>
<b>(i)</b> It is not suitable for washing purpose in hard water	<b>(i)</b> It is suitable for washing purpose in any type of hard water
<b>(ii)</b> They are biodegradable.	<b>(ii)</b> They are non-biodegradable
<b>(iii)</b> It is derived from fats or oils	<b>(iii)</b> It is prepared from hydrocarbon of petroleum.

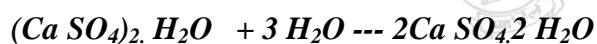
**EXTRA QUESTIONS AND ANSWERS**

**Q1. How is plaster of Paris obtained from gypsum? How is it set to hard mass?**

**Ans:** Plaster of Paris is prepared by heating Gypsum at  $120^\circ\text{C}$ - $130^\circ\text{C}$ .



The setting of Plaster of Paris is due to the reformation of gypsum with the absorption of water.



(Gypsum)



**Q2. How does bleaching powder act as a disinfectant?**

**Ans:** Chlorine liberated from bleaching powder kills germs by oxidation

**Q3. Chemically, what are soaps? How do the soap molecules behave in aqueous solution during washing?**

**Ans:** Soaps are Sodium or Potassium salt of fatty acids. When soap is dissolved in water, it forms micelles which the soap molecules are arranged radially, with the hydrocarbon end directly towards the centre while the water attracting part (ionic part) outwards.

**Q4. How is bleaching powder prepared? What chemical is responsible for the bleaching and disinfectant activity of bleaching powder?**

**Ans:** Bleaching powder is prepared by passing  $\text{Cl}_2$  gas over dry slakedlime at  $35^\circ\text{C}$ - $45^\circ\text{C}$ .



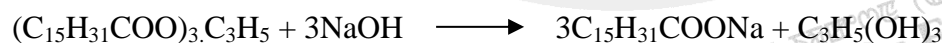
$\text{Cl}_2$  liberated by the decomposition of bleaching powder is responsible for the bleaching and disinfectant activity.

**Q5. Mention a place in Manipur where brine well is available.**

**Ans:** Ningel / Chandrakhong / Waikhong.

**Q6. Describe the preparation of soap from fat. Write the relevant chemical equations. Why is soap not suitable for washing in hard water?**

**Ans:** When oil or fats are heated with a solution of Sodium hydroxide, they break down to form sodium salt of respective fatty acid called Soap and Glycerol.



Fat

Soap

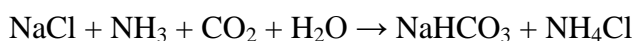
Glycerol

When common salt is added, Soap floats on the surface. Then it is skimmed off. Soap is not suitable for washing in hard water. It reacts with  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions present in hard water forming Calcium and Magnesium salts of fatty acids.



**Q7.** *What happens when an excess of carbon dioxide gas is passed through a saturated solution of sodium chloride containing dissolved ammonia gas? Give the balanced chemical equation.*

**Ans:** Sodium hydrogen carbonate or sodium bicarbonate is formed.



**Q8.** *Washing Soda, a white crystalline solid on heating becomes amorphous in nature. What is the type of reaction involved in the change?*

**Ans:** Decomposition Reaction.

**Q9.** *Distinguish between Soap and detergent.*

**Ans:**

<b>DIFFERENCE</b>	
<b>SOAP</b>	<b>DETERGENT</b>
i) It is not suitable for washing purpose in hard water.	i) It is suitable for washing purpose in any type of water.
ii) They are biodegradable.	ii) They are non-biodegradable.
iii) It is derived from fats or oil.	iii) It is prepared from hydrocarbon of Petroleum.

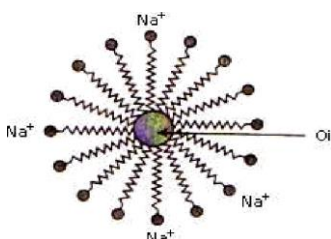
**Q10.** *How is freezing mixture made?*

**Ans:** Freezing mixture is made by mixing ice and common salt.

**Q11.** *Explain the cleansing action of soaps.*

**Ans:** The dirt present on clothes is organic in nature and insoluble in water. Therefore, it cannot be removed by only washing with water. When soap is dissolved in water, its hydrophobic ends attach themselves to the dirt and remove it from the cloth. Then, the molecules of soap arrange in micelle formation and trap the dirt at the centre of the cluster. These micelles remain suspended in the water. Hence, the dust particles are easily rinsed away by water.

Formation of micelles





**Q12.** *What is Salt cake?*

**Ans:** Sodium Sulphate ( $\text{Na}_2\text{SO}_4$ ) obtained by reacting  $\text{NaCl}$  with concentrated  $\text{H}_2\text{SO}_4$  is called Salt Cake.



**Q13.** *Write the uses of NaOH.*

**Ans:**  $\text{NaOH}$  is used for making Soap, detergent, paper and artificial fibre.

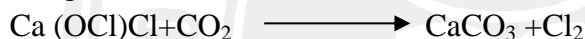
**Q14.** *Name the compound used to remove ink-stains and for bleaching clothes? How is it obtained?*

**Ans:** The name of the compound is Sodium hypochlorite. It is obtained by reacting sodium hydroxide and Chlorine.



**Q15.** *What will happen when Bleaching powder is exposed to air?*

**Ans:** Carbon dioxide and moisture of the atmosphere decompose bleaching powder liberating Chlorine.



**Q16.** *Why does Bleaching powder act as a bleaching agent?*

**Ans:** It is because when bleaching powder is decomposed, the free chlorine is responsible for oxidizing and bleaching property act as a bleaching agent.

**Q17.** *Write the uses of Sodium hydrogen Carbonate or Sodium bicarbonate.*

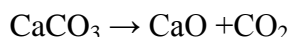
**Ans:** (i) Sodium hydrogen Carbonate is used in medicine to reduce acidity in the stomach.

a. It is used as baking powder when mixed with mild acid.

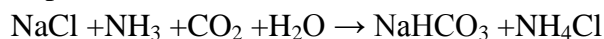
b. It is used in soda-acid fire extinguishers.

**Q18.** *Describe the Solvay process for the preparation of Washing Soda.*

**Ans:** Solvay process is used to prepare sodium carbonate. In this process sodium chloride is used to prepare sodium carbonate using Ammonia. This process centered around a large hollow tower. At the bottom, calcium carbonate (limestone) was heated to release carbon dioxide



At the top, a concentrated solution of sodium chloride and ammonia entered the tower. As the carbon dioxide bubbled up through it, sodium bicarbonate precipitated







The sodium bicarbonate was then converted to sodium carbonate by heating it, releasing water and carbon dioxide:



**Q19. How is NaOH obtained from NaCl?**

**Ans:** On passing electricity through brine in specially designed electrolytic cell, Sodium Chloride is decomposed to produce sodium hydroxide, hydrogen and Chlorine.



**Q20. What is Water of Crystallisation? How does the Blue colour of copper sulphate disappear when it is heated?**

**Ans:** The definite number of molecules of water chemically attached to each formula Unit of Salt in its crystalline form is called water of crystallization.

The Blue colour of Copper Sulphate is due to presence of water of crystallization i.e.  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ . It is also called Blue Vitriol. The Blue colour of copper sulphate disappears when it is heated because the water molecules disappear and becomes colourless.

**Q21. How is Baking Soda prepared?**

**Ans:** When an excess of  $\text{CO}_2$  is bubbled through a nearly saturated solution of Common salt containing Ammonia gas, then Sparingly soluble Sodium Hydrogen carbonate (Baking Soda) and Ammonium chloride are formed.



**Q22. How is pure Sodium Chloride prepared?**

**Ans:** Pure Sodium Chloride is prepared by passing Hydrochloric acid gas into a saturated solution of impure salt. The pure is precipitated and obtained on filtration. It is then dried.

**Q23. Write the uses of Chlorine gas.**

**Ans:** Chlorine gas is used for sterilizing water (Water treatment), in swimming pools; manufacture of PVC (Poly Vinyl Chloride) Plastics, Pesticides and CFC (Chloro Fluoro Carbon)

**Q24. Why is the use of CFC as refrigerant not encouraged?**

**Ans:** The use of CFC as refrigerant is not encouraged as it causes depletion of Ozone layer.



**Q25. Write one advantage of Soap over detergent.**

**Ans:** Soaps are biodegradable.

**Q26. Why has detergent replaced Soap as a washing agent?  
“or”**

**What is the advantage of detergent over Soap?**

**Ans:** Detergent produces more lather than Soap in hard water.

**Q27. How does baking powder differ from baking soda?**

**Ans:** Baking soda is a single compound which has sodium hydrogen carbonate which is alkaline (basic) in nature .

Baking powder is a mixture of sodium hydrogen carbonate and a mild edible(eatable) acid such as tartaric acid. When baking powder mixes with water, then the sodium hydrogen carbonate reacts with tartaric acid to evolve carbon dioxide gas which gets trapped in the wet dough and bubbles out slowly making the cake to rise and hence 'soft and spongy'. The equation which takes place can be shown as:



**Q28. What is available chlorine?**

**Ans:** Available chlorine is the amount of chlorine set free by the sample of bleaching powder when decomposed. This free chlorine is responsible for the oxidizing and bleaching properties of bleaching powder.

**Q29. Write the uses of Sodium hypochlorite solution.**

**Ans:** It is used to remove ink stains and for bleaching clothes etc.

**Q30. People use a variety of methods to wash clothes. Usually after adding the soap, they 'beat' the clothes on a stone, or beat it with a paddle, scrub with a brush or the mixture is agitated in a washing machine. Why is agitation necessary to get clean clothes?**

**Ans:** Molecules of soap form micelles with dirt, such as grease. Micelles remain suspended as colloid. To remove dirt in the form of micelles from clothes agitation is necessary to get clean clothes.

**Q31. Why does Soap form insoluble scum with hard water?**

**Ans:** Soap forms insoluble scum with hard water due to the formation of Calcium and magnesium salts of fatty acids.



**Q32. What is Salting out of Soap?**

**Ans :** It is the process of precipitation of soap from soap solution by the addition of common salt.

**Q33. Write the uses of Plaster of Paris.**

**Ans:**

- (i) It is used for making casts in moulds.
- (ii) It is used as a plaster for supporting fractured bones in the right position.
- (iii) It is used for wall plaster.

**Q34. Write the uses of Washing Soda.**

**Ans:**

- (i) It is used as cleansing agent for domestic purposes and that is why it is called washing soda.
- a) It is used in the manufacture of glass, soap, paper and borax.
- b) It is used for making hard water soft

**Q35. Write the uses of bleaching powder.**

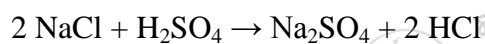
**Ans:**

- (i) It is used as a disinfectant.
- (ii) It is used for sterilizing water to make water free from disease causing germs and bacteria.
- (iii) It is used as an oxidizing agent in chemical industries.

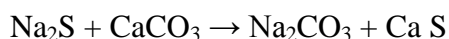
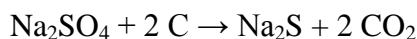
**Q36. Explain the Nicholas Leblanc process for the preparation of Washing Soda.**

**Ans:** A French chemist Nicholas Leblanc prepared washing soda directly from sodium chloride in the following steps:

- (i) Sodium Chloride is treated with concentrated sulphuric acid to form Sodium Sulphate which is called salt cake.



- (ii) The salt cake is grounded and mixed with its own weight of limestone and half its weight of Coal and strongly heated to 800- 1000°C. The salt cake is reduced by coke to sodium sulphide, which then reacts with calcium carbonate to form Sodium carbonate



**Q37.** *What is bleaching powder chemically?*

**Ans:** Chemically bleaching powder is calcium chloro-hypochlorite ( $\text{CaOCl}_2$ ).

### PROBABLE AND LAST YEAR QUESTIONS

**Q1.** *Why is electrolysis of aqueous sodium chloride is carried out in specially designed electrolytic cells? What happens when the gas liberated from anode is passed through calcium hydroxide solution?*

**Ans:** If sodium hydroxide and chlorine produce are allowed to come in contact, they react even in the cold and whole labour will be wasted.



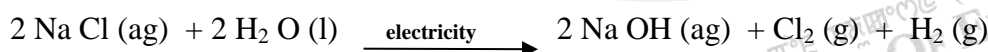
Chlorine and hydrogen gas can also combine to form HCl with explosion. The gas liberated at the anode is chlorine. It reacts with calcium hydroxide solution to form calcium chloride, calcium hypochloride and water as follows.



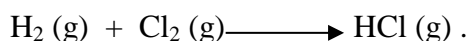
**Q2.** *Justify that common salt is key raw material for the manufacture of NaOH, HCl and Bleaching powder.*

**Ans:-**

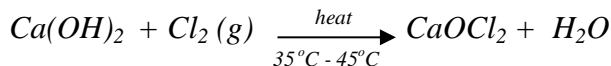
(i) Na OH is prepared by the electrolysis of brine solution.



(ii) Chlorine liberated from electrolysis of brine solution is made to combine with  $\text{H}_2$  to form HCl.



(iii) Chlorine liberated from electrolysis of brine solution is allowed to pass over moderately dry slaked lime at about  $35-45^\circ \text{C}$  to form bleaching powder.



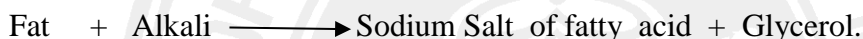
**Q3.** *Enumerate the observation obtained when blue vitriol is strongly heated in a dry test tube.*

**Ans:-**

- (i) Blue  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  changes to white ( $\text{CuSO}_4$ ).
- (ii) Water droplets are collected at the mouth of the test tube.

**Q4.** *How does aqueous extract of ash (adulation) cleanse a piece of cotton cloth soiled with oil? Write the relevant equation.*

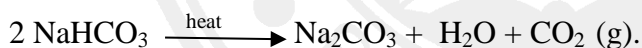
**Ans:-** The ash is rich in carbonates of potassium, sodium and the solution is actually alkaline. The oil present in the cloth is pulled out by the alkali (hydrolysed) and make clean under the following reaction.



**Q5.** *What is the difference between baking soda and baking powder in composition? How does baking powder make bread or cake soft and fluffy? Give equations.*

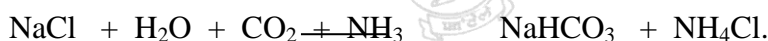
**Ans:-** Baking soda is  $\text{NaHCO}_3$  while baking powder is a mixture of  $\text{NaHCO}_3$  and a mild edible acid like tartaric acid.

On heating or mixed with water baking powder liberate  $\text{CO}_2$  gas which makes bread or cake soft and fluffy.



**Q6.** *What is the difference between baking soda and washing soda in chemical composition? How is baking soda prepared and how can it be converted into washing soda?*

**Ans:-** Baking soda is  $\text{NaHCO}_3$  while washing soda is  $\text{Na}_2\text{CO}_3 \cdot 10 \text{H}_2\text{O}$ .  $\text{NaHCO}_3$  is prepared by passing  $\text{CO}_2$  gas through saturated brine solution containing ammonia ( $\text{NH}_3$ ).

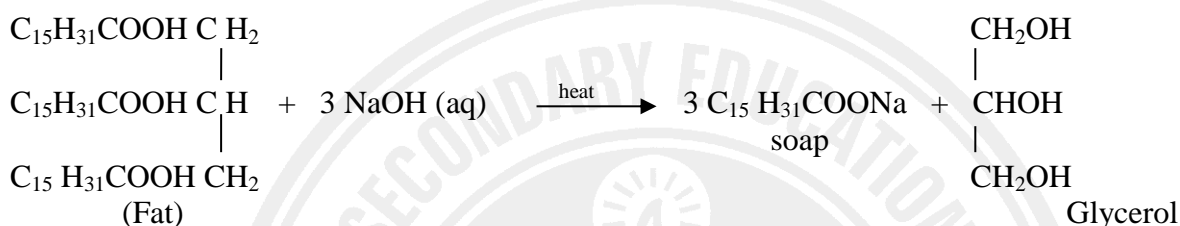


The sparingly soluble  $\text{NaHCO}_3$  is separated by filtration and dried  $\text{NaHCO}_3$  on calcination and recrystallisation below  $32^\circ\text{C}$  gives washing soda.



**Q7.** Describe the preparation of soap from fat. Write the relevant chemical equations. Why is soap not suitable for washing in hard water ?

**Ans:-** Soap is prepared from fat or oil by heating it with solution of sodium hydroxide. In doing so sodium salt of fatty acid (soap) and glycerol are formed. The soap is precipitated by adding common salt and can be skimmed out.



Soap forms Calcium and magnesium salt of fatty acid when treated with hard water as insoluble scum.

**Q8.** Write a typical formula of a detergent.

**Ans:**  $\text{C}_{17}\text{H}_{35} \longrightarrow \text{OSO}_3\text{Na}$  or  $\text{C}_{15}\text{H}_{35} - \text{SO}_3^- \text{Na}^+$ .

**Q9.** Draw a neat labelled diagram of the experimental set up to show the loss of water of crystallisation from hydrated salt on heating.

**Ans:-**

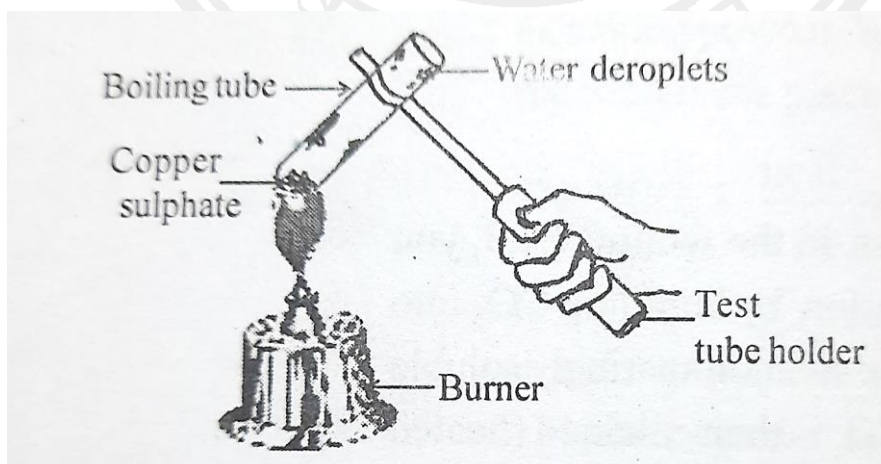


Figure shows that water of crystallisation from hydrated salt on heating



**Q10.** Explain how washing with water sterilized with Bleaching powder affect coloured linen and cotton clothes.

**Ans :-** When the water is sterilized with bleaching powder ,available

chlorine is liberated . The solution has bleaching action which can decrease the shades of the colour of linen and cotton clothes.

**Q11.** What is the difference between soaps and detergents in chemical composition? How they behave differently towards hard water?

**Ans:-** Soaps are sodium salt of long chain fatty acid which has two ends whereas detergents are ammonium or sodium sulphonate salts of long chain hydrocarbons which are generally obtained from petroleum .

Soaps forms insoluble scum with hard water due to the formation of calcium and magnesium salts of fatty acids.

Detergents can form copious lather even with hard water therefore washes clothes more effectively.

**Q12.** How can a grease stain on a woolen coat be removed? What principle of solubility is applied in the removal process?

**Ans:-** Grease stain can be removed by washing it with nonpolar solvents like petrol, kerosene, benzene etc.

Grease being covalent compound (hydrocarbon) is soluble in these solvents. Principle of solubility “Like dissolves like” is applied here.

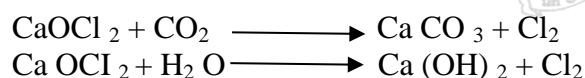
**Q13.** What is the general composition of a freezing mixture?

**Ans:-** Ice and common salt in the ratio of about 4:1.

**Q14.** Why is bleaching powder stored out of contact with air ?

**Ans:-** Carbondioxide and moisture of the atmosphere decomposes bleaching powder liberating chlorine.

OR





মণিগোবিন্দোৰ্ণ আৰু নগৰসংগ্ৰহ (আৰু)

DEPARTMENT OF EDUCATION (S)

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**Q15. What is water of crystallization?**

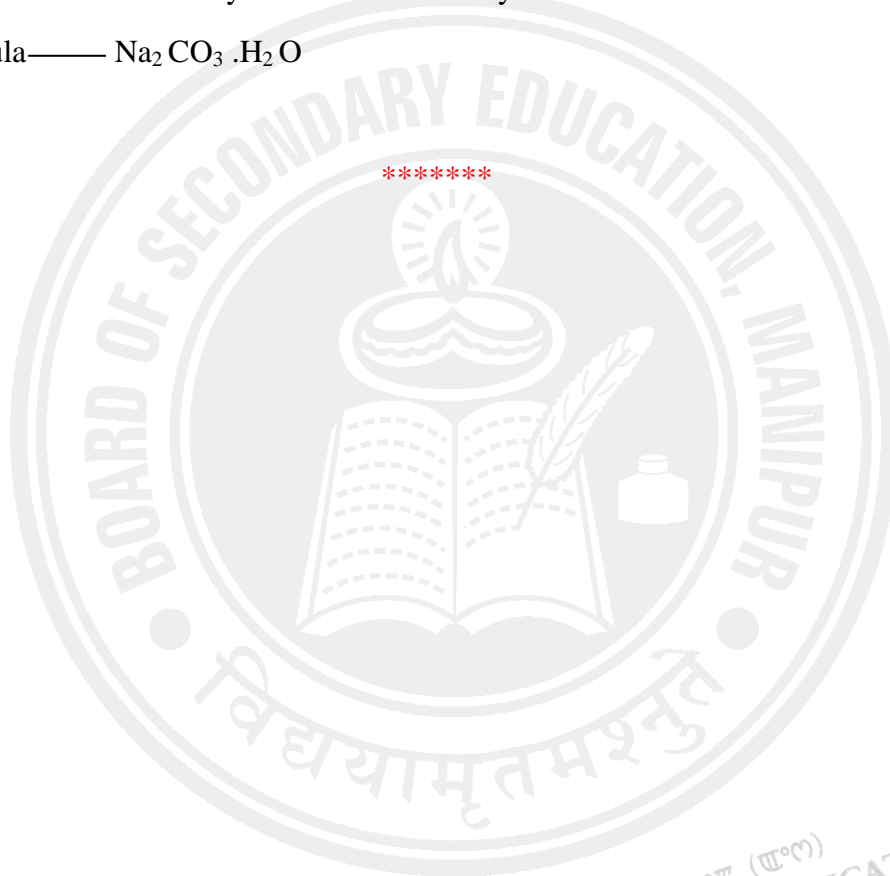
**Ans:-** The fixed molecules of water ( water molecules ) presence in each formula unit of a salt which imparts colour and shape ( crystalline structure ) of the salt is known as water of crystallization .

**Q16. What is crystal carbonate? Give its chemical formula.**

**Ans:-** Sodium Carbonate monohydrate is known as crystal carbonate .

General Formula——  $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$

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