

10th Science Important Case Study Questions for Acids, Bases And Salts 2024

10th Standard

Science

SECTION A

2 x 4 = 8

1) A compound, X of sodium forms a white powder. It is a constituent of baking powder and is used in some antacids. When heated it gives a compound, Y which is anhydrous and absorbs water to become a hydrated salt. When this salt is kept in open air, it loses water molecules in a process called efflorescence. When dissolved in water it forms a strong base and a weak acid, Z.

(i) What is the compound, X?

(a) NaHCO₃ (b) Na₂CO₃ (c) NaOH (d) NaCl

(ii) The compound, Y is

(a) (b) (c) (d)

NaHCO₃ Na₂CO₃ Na₂CO₃ 10H₂O NaCl

(iii) What is the nature of the solution formed by dissolving Y in water?

(a) (b) (c) (d) It remains

Alkaline Acidic Neutral insoluble

(iv) Identify the compound, Z.

(a) CO₂ (b) H₂CO₃ (c) NaOH (d) H₂O

(v) Sodium carbonate is a basic compound because it is a salt of a

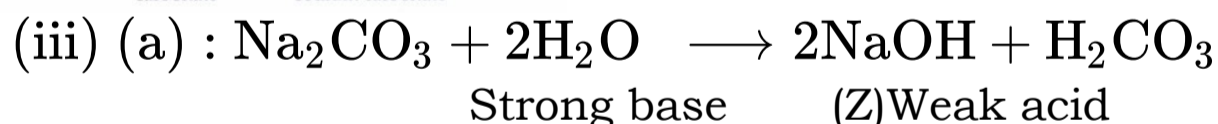
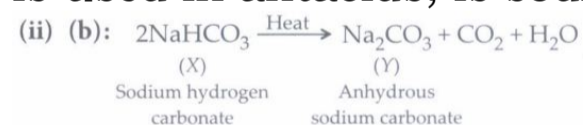
(a) strong acid and (b) weak acid and

strong base weak base

(c) strong acid and (d) weak acid and

weak base strong base

Answer : (i) **(a):** The compound of sodium that is a constituent of baking powder and is used in antacids, is sodium hydrogen carbonate (NaHCO₃).

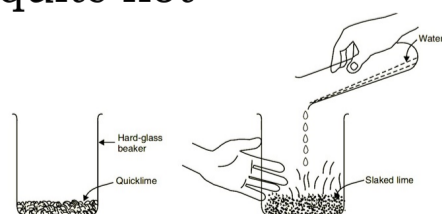


NaOH ionises completely to give a large amount of OH⁻ ions whereas H₂CO₃ ionises partially to give a small amount of H⁺ ions. Hence, the solution is overall alkaline.

(iv) **(b):** Z is carbonic acid, a weak acid formed when Na₂CO₃ is dissolved in water.

(v) **(d)**

2) Ajay wanted his house to be white washed. He bought 10 kg of quicklime from the market. Before mixing all 10 kg, he took one beaker and took small quantity of quicklime in a beaker then he added some water, he observed that the water started boiling even when it was not being heated and he touch the beaker carefully. The beaker feels to be quite hot



(i) What is formed when water is added to quicklime.

(a) CaCO₃ (b) CaO (c) Ca(OH)₂ (d) NaOH

(ii) The nature of the product formed is:

(a) Acidic (b) Basic (c) Neutral (d) Both (a) and (b)

(iii) The chemical reaction between quicklime and water is characterised by :

(a) evolution of hydrogen gas

(b) formation of slaked lime precipitate

(c) change in temperature of mixture

(d) change in colour of the product

The chemical reaction between quicklime (CaO) and water is characterized by change in temperature of mixture. The reaction is exothermic (heat is liberated) and a hissing sound is heard. The product is slaked lime (calcium hydroxide).

(iv) Which of the following statements is correct about the above reaction based on your observations?

I. It is an endothermic reaction.

II. It is an exothermic reaction

III. The pH of the resulting solution will be more than seven.

IV. The pH of the resulting solution will be less than seven.

(a) I and II (b) II and III (c) I and IV (d) III and IV

It is an exothermic reaction because heat is given out. The resulting compound is $\text{Ca}(\text{OH})_2$ which is basic in nature. So the pH of the resulting solution will be more than seven.

(v) Which of the following is not an endothermic reaction ?

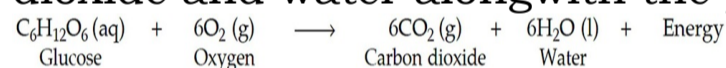
(a) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$

(b) $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$

(c) $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

(d) $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$

During respiration, glucose combines with oxygen in the cells of our body to form carbon dioxide and water alongwith the production of energy.



Respiration is an exothermic process because energy is produced during this process

Answer : (i) **(c)** Calcium hydroxide, $\text{Ca}(\text{OH})_2$

(ii) **(b)** Calcium hydroxide is basic in nature

(iii) **(c)** change in temperature of mixture

(iv) **(b)** II and III

(v) **(d)** $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$