

National Institute of Open Schooling
Senior Secondary Course: Chemistry
Chapter- 17 (Hydrogen and s-Block Elements)



Worksheet-17

1. Om Prakash was studying the trend of solubility of alkaline earth hydroxides in water. By doing actual experiments, he came to know that the solubility of hydroxides of alkaline earth metals in water increases down the group i.e. $\text{Be}(\text{OH})_2$ is least soluble while $\text{Ba}(\text{OH})_2$ maximum soluble in water. He discussed this problem with his classmate Anil. He explained the phenomenon and Om Prakash got satisfied.

(a) What explanation did Anil give to Om Prakash?

(b) What values are attached to this explanation?

(c) $\text{Ba}(\text{OH})_2$ is soluble in water while BaSO_4 is almost insoluble. Give reason.

2. During his experiments, Rajender found that sodium can be used to dry diethyl ether but not ethyl alcohol. Rajender wanted to know the reason behind it. Therefore he asked his friend Annu about this problem. Annu explained the chemistry behind it and Rajender got satisfied.

(a) What explanation did Annu gave to Rajender?

(b) Sodium is found to be more useful than potassium.

(c) What values are displayed by Annu?

3. Quicklime is an important compound. It is prepared by thermal decomposition of limestone in tall furnaces called kiln. During such an operation the top of the Chimney of the kiln was closed. After one week when the kiln was opened it was observed that very little lime was formed. The workers reported the poor result to the Production engineer who suggested them to increase the height of the chimney. After that there was no improvement in the production of lime. The professor suggested him to keep the top of the chimney opened. This helped.

(a) Represent the thermal decomposition of lime stone by a chemical equation.

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- (b) Why was the production of lime not satisfactory when the top of the chimney was closed?
- (c) How did the suggestion of the professor help in the improvement of the production of lime?
- (d) Mention the associated value with this incidence.
4. The hydroxides and carbonates of sodium and potassium are easily soluble in water while the corresponding salts of magnesium and calcium are sparingly soluble in water. Explain.
5. Explain what happens when
- (i) Sodium hydrogen carbonate is heated.
 - (ii) Sodium with mercury reacts with water.
 - (iii) Fused sodium metal reacts with ammonia.
6. State as to why
- (a) An aqueous solution of sodium carbonate gives an alkaline test.
 - (b) Sodium is prepared by electrolytic method & not by chemical method.
 - (c) Lithium on being heated in the air mainly forms mono-oxide & not the peroxides.
7. Like Lithium in group-I, beryllium shows anomalous behavior in group II. Write three such properties of beryllium which makes it anomalous in the group.
8. Complete the following equations:
- (a) $\text{Ca} + \text{H}_2\text{O} \rightarrow ?$
 - (b) $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow ?$
 - (c) $\text{BeO} + \text{NaOH} \rightarrow ?$

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NOTE. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each question.

9. Assertion (A): The carbonate of lithium decomposes easily on heating to form lithium oxide and CO_2 .

Reason (R) : Lithium being very small in size polarizes large carbonate ion leading to the formation of more stable Li_2O and CO_2 .

- (i) Both A and R are correct and R is the correct explanation of A.
- (ii) Both A and R are correct but R is not the correct explanation of A.
- (iii) Both A and R are not correct
- (iv) A is not correct but R is correct.

10. Assertion (A): Beryllium carbonate is kept in the atmosphere of carbon dioxide.

Reason (R): Beryllium carbonate is unstable and decomposes to give beryllium oxide and carbon dioxide.

- (i) Both A and R are correct and R is the correct explanation of A.
- (ii) Both A and R are correct but R is not the correct explanation of A.
- (iii) Both A and R are not correct.
- (iv) A is not correct but R is correct.