CHEMISTRY-1

s-Block Elements

[Set-1]

SECTION-A

1. Which of the following salt is used as a source of sodium ions in the biological fluids?

   (i) Sodium chloride (ii) Sodium hydrogen carbonate

   (iii) Sodium carbonate (iv) Sodium sulphate

2. Which of the ion is most heavily hydrated in the aqueous medium?

   (i) Li^+ (ii) Na^+ (iii) K^+ (iv) Rb^+

3. The low solubility of CsI in water is due to

   (i) large size of both Cs and I ions (iii) high lattice enthalpy of CsI

   (iii) high polarizing power of Cs^+ ion (iv) Low hydration enthalpy of its two ions

4. Hydrolysis of alkali metal MO_2 superoxides gives

   (i) H_2O_2 and MOH (ii) only MOH

   (iii) MOH and O_2 (iv) MOH, O_2 and H_2O_2

5. **Match the following**

	Column-I		**Column-II**
A.	Aqueous solution is basic	1.	Sodium
B.	High lattice enthalpy	2.	Sodium carbonate
C.	Ammoniacal solution is blue	3.	Lithium fluoride
D.	Does not undergo hydrolysis	4.	Sodium sulphate

	A	B	C	D
(i)	4	2	1	3
(ii)	2	4	1	3
(iii)	2	3	1	4
(iv)	4	1	3	2

Assertion-Reason type Questions:

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true and R is not the correct explanation of A

(c) A is true but R is false

(d) A is false but R is true

6. A: Lithium reacts directly with nitrogen of air to form Lithium nitride

   R: Lithium nitride has a high lattice enthalpy

7. A: Beryllium carbonate is kept in the atmosphere of carbon dioxide.

   R: Beryllium carbonate is thermally unstable.

Passage based questions:

The alkaline earth metals forms compounds which are predominantly ionic but less ionic than the corresponding compounds of alkali metals. The oxides and other compounds of beryllium and magnesium are more covalent than those formed by the heavier and larger sized members (Ca, Sr, Ba). The thermal stability of oxosalts increases with increasing cationic size. The solubility of oxosalts in water decreases as the atomic number of the metal ion increases.

8. The most stable metal carbonate is

   (i) $MgCO_3$ (ii) Na_2CO_3 (iii) Li_2CO_3 (iv) $BeCO_3$

9. $BeSO_4$ is soluble in water but $BaSO_4$ is insoluble due to

   (i) low lattice enthalpy of $BeSO_4$ (ii) high hydration enthalpy of Be^{2+} ions

   (iii) high covalent nature of $BeSO_4$ (iv) high ionic character of $BaSO_4$

10. Which of the following chloride is the most covalent?

    (i) $BeCl_2$ (ii) LiCl (iii) $MgCl_2$ (iv) KCl

SECTION-B

11. Complete the following equations

    (i) $BeO + C + Cl_2 \xrightarrow{850–1050\,K}$

    (ii) $Na_2O_2 + H_2SO_4 \longrightarrow$

OR

What happens when

(i) Sodium reacts with 3M ammonia solution

(ii) Beryllium oxide is dissolved in excess of hydrochloric acid.

12. Give reasons:

(i) The ionic mobility of the alkali metal ions in aqueous medium follows the order

$Li^+ < Na^+ < K^+ < Rb^+ < Cs^+$

(ii) BeO is amphoteric but BaO is basic in nature

13. Account for the followings:

(a) Chlorides of group 2 metals are hygroscopic in nature.

(b) Sodium form sodium peroxide and potassium form potassium superoxide on reaction with oxygen

(c) Be and Mg do not show colour when subjected to flame.

14. Give reason:

(i) aqueous solution of $BeCl_2$ is acidic in nature

(ii) BeO is insoluble in water whereas BaO is soluble in water

(iii) Molten sodium hydride liberates hydrogen gas at anode

OR

Give reason:

(i) Na, K and Rb are used in photoelectric effect

(ii) Bright silvery white freshly cut sodium turns grey on exposure to air.

(iii) BeF_4^{2-} exist but MgF_4^{2-} does not.

15. (i) Give the structure of $BeCl_2$ in the vapour state and in the solid state.

(ii) Write all the equations for the preparation of sodium carbonate by Solvay's process. Why can't potassium carbonate be prepared by this method?

OR

(i) Give reason:

(a) All alkali metals show colour when subjected to flame.

(b) Lithium is hard, other alkali metals are soft

(ii) Complete the following equations:

(a) $Be[OH]_2 + NaOH + H_2O \longrightarrow$

(b) $LiNO_3 \xrightarrow{Heat}$

(c) $BaO_2 + H_2O \longrightarrow$

