

Chapter 10. s-Block Elements

- Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field?
(a) K (b) Rb
(c) Li (d) Na
(NEET 2017)
- The suspension of slaked lime in water is known as
(a) lime water (b) quick lime
(c) milk of lime
(d) aqueous solution of slaked lime.
(NEET-II 2016)
- In context with beryllium, which one of the following statements is incorrect?
(a) It is rendered passive by nitric acid.
(b) It forms Be_2C .
(c) Its salts rarely hydrolyze.
(d) Its hydride is electron-deficient and polymeric.
(NEET-II 2016)
- Which of the following statements is false?
(a) Ca^{2+} ions are not important in maintaining the regular beating of the heart.
(b) Mg^{2+} ions are important in the green parts of the plants.
(c) Mg^{2+} ions form a complex with ATP.
(d) Ca^{2+} ions are important in blood clotting.
(NEET-I 2016)
- The product obtained as a result of a reaction of nitrogen with CaC_2 is
(a) CaCN_3 (b) Ca_2CN
(c) $\text{Ca}(\text{CN})_2$ (d) CaCN
(NEET-I 2016)
- On heating which of the following releases CO_2 most easily?
(a) Na_2CO_3 (b) MgCO_3
(c) CaCO_3 (d) K_2CO_3
(2015)
- 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What will be the percentage purity of magnesium carbonate in the sample?
(At. wt. of Mg = 24)
(a) 96 (b) 60
(c) 84 (d) 75 (2015)
- The function of "Sodium pump" is a biological process operating in each and every cell of all animals. Which of the following biologically important ions is also a constituent of this pump?
(a) K^+ (b) Fe^{2+}
(c) Ca^{2+} (d) Mg^{2+}
(2015, Cancelled)
- Solubility of the alkaline earth metal sulphates in water decreases in the sequence
(a) $\text{Sr} > \text{Ca} > \text{Mg} > \text{Ba}$
(b) $\text{Ba} > \text{Mg} > \text{Sr} > \text{Ca}$
(c) $\text{Mg} > \text{Ca} > \text{Sr} > \text{Ba}$
(d) $\text{Ca} > \text{Sr} > \text{Ba} > \text{Mg}$ (2015, Cancelled)
- In Castner-Kellner cell for production of sodium hydroxide
(a) brine is electrolyzed using graphite electrodes
(b) molten sodium chloride is electrolysed
(c) sodium amalgam is formed at mercury cathode
(d) brine is electrolyzed with Pt electrodes
(Karnataka NEET 2013)
- Which one of the alkali metals, forms only, the normal oxide, M_2O on heating in air?
(a) Rb (b) K
(c) Li (d) Na (2012)
- The ease of adsorption of the hydrated alkali metal ions on an ion-exchange resins follows the order:

- (a) $\text{Li}^+ < \text{K}^+ < \text{Na}^+ < \text{Rb}^+$
 (b) $\text{Rb}^+ < \text{K}^+ < \text{Na}^+ < \text{Li}^+$
 (c) $\text{K}^+ < \text{Na}^+ < \text{Rb}^+ < \text{Li}^+$
 (d) $\text{Na}^+ < \text{Li}^+ < \text{K}^+ < \text{Rb}^+$ (2012)
- 13.** Which of the following compounds has the lowest melting point?
 (a) CaCl_2 (b) CaBr_2
 (c) CaI_2 (d) CaF_2 (2011)
- 14.** Which one of the following is present as an active ingredient in bleaching powder for bleaching action?
 (a) CaOCl_2 (b) $\text{Ca}(\text{OCl})_2$
 (c) CaO_2Cl (d) CaCl_2 (2011)
- 15.** Match List-I with List-II for the compositions of substances and select the correct answer using the code given above.
- | List-I
(Substances) | List-II
(Composition) |
|------------------------|---|
| (A) Plaster of Paris | (i) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ |
| (B) Epsomite | (ii) $\text{CaSO}_4 \cdot 1/2 \text{H}_2\text{O}$ |
| (C) Kieserite | (iii) $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ |
| (D) Gypsum | (iv) $\text{MgSO}_4 \cdot \text{H}_2\text{O}$ |
| | (v) CaSO_4 |
- (a) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
 (b) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
 (c) (A)-(i), (B)-(ii), (C)-(iii), (D)-(v)
 (d) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i) (Mains 2011)
- 16.** Which of the following alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy?
 (a) CaSO_4 (b) BeSO_4
 (c) BaSO_4 (d) SrSO_4 (2010)
- 17.** Property of the alkaline earth metals that increases with their atomic number
 (a) solubility of their hydroxides in water
 (b) solubility of their sulphates in water
 (c) ionization energy
 (d) electronegativity (2010)
- 18.** Which one of the following compounds is a peroxide?
 (a) KO_2 (b) BaO_2
 (c) MnO_2 (d) NO_2 (2010)
- 19.** The compound *A* on heating gives a colourless gas and a residue that is dissolved in water to obtain *B*. Excess of CO_2 is bubbled through aqueous solution of *B*, *C* is formed which is recovered in the solid form. Solid *C* on gentle heating gives back *A*. The compound is
 (a) CaCO_3 (b) Na_2CO_3
 (c) K_2CO_3 (d) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (Mains 2010)
- 20.** In the case of alkali metals, the covalent character decreases in the order
 (a) $\text{MF} > \text{MCl} > \text{MBr} > \text{MI}$
 (b) $\text{MF} > \text{MCl} > \text{MI} > \text{MBr}$
 (c) $\text{MI} > \text{MBr} > \text{MCl} > \text{MF}$
 (d) $\text{MCl} > \text{MI} > \text{MBr} > \text{MF}$ (2009)
- 21.** Which of the following oxides is not expected to react with sodium hydroxide?
 (a) CaO (b) SiO_2
 (c) BeO (d) B_2O_3 (2009)
- 22.** Equimolar solutions of the following were prepared in water separately. Which one of the solutions will record the highest pH?
 (a) MgCl_2 (b) CaCl_2
 (c) SrCl_2 (d) BaCl_2 (2008)
- 23.** The sequence of ionic mobility in aqueous solution is
 (a) $\text{Rb}^+ > \text{K}^+ > \text{Cs}^+ > \text{Na}^+$
 (b) $\text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$
 (c) $\text{K}^+ > \text{Na}^+ > \text{Rb}^+ > \text{Cs}^+$
 (d) $\text{Cs}^+ > \text{Rb}^+ > \text{K}^+ > \text{Na}^+$ (2008)
- 24.** The alkali metals form salt-like hydrides by the direct synthesis at elevated temperature. The thermal stability of these hydrides decreases in which of the following orders?
 (a) $\text{NaH} > \text{LiH} > \text{KH} > \text{RbH} > \text{CsH}$
 (b) $\text{LiH} > \text{NaH} > \text{KH} > \text{RbH} > \text{CsH}$
 (c) $\text{CsH} > \text{RbH} > \text{KH} > \text{NaH} > \text{LiH}$
 (d) $\text{KH} > \text{NaH} > \text{LiH} > \text{CsH} > \text{RbH}$ (2008)
- 25.** The correct order of increasing thermal stability of K_2CO_3 , MgCO_3 , CaCO_3 and BeCO_3 is
 (a) $\text{BeCO}_3 < \text{MgCO}_3 < \text{CaCO}_3 < \text{K}_2\text{CO}_3$
 (b) $\text{MgCO}_3 < \text{BeCO}_3 < \text{CaCO}_3 < \text{K}_2\text{CO}_3$
 (c) $\text{K}_2\text{CO}_3 < \text{MgCO}_3 < \text{CaCO}_3 < \text{BeCO}_3$
 (d) $\text{BeCO}_3 < \text{MgCO}_3 < \text{K}_2\text{CO}_3 < \text{CaCO}_3$ (2007)
- 26.** In which of the following the hydration energy is higher than the lattice energy?
 (a) MgSO_4 (b) RaSO_4
 (c) SrSO_4 (d) BaSO_4 (2007)

27. The correct order of the mobility of the alkali metal ions in aqueous solution is
 (a) $\text{Rb}^+ > \text{K}^+ > \text{Na}^+ > \text{Li}^+$
 (b) $\text{Li}^+ > \text{Na}^+ > \text{K}^+ > \text{Rb}^+$
 (c) $\text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Li}^+$
 (d) $\text{K}^+ > \text{Rb}^+ > \text{Na}^+ > \text{Li}^+$ (2006)
28. The correct sequence of increasing covalent character is represented by
 (a) $\text{LiCl} < \text{NaCl} < \text{BeCl}_2$
 (b) $\text{BeCl}_2 < \text{LiCl} < \text{NaCl}$
 (c) $\text{NaCl} < \text{LiCl} < \text{BeCl}_2$
 (d) $\text{BeCl}_2 < \text{NaCl} < \text{LiCl}$ (2005)
29. A solid compound X on heating gives CO_2 gas and a residue. The residue mixed with water forms Y . On passing an excess of CO_2 through Y in water, a clear solution Z is obtained. On boiling Z , compound X is reformed. The compound X is
 (a) $\text{Ca}(\text{HCO}_3)_2$ (b) CaCO_3
 (c) Na_2CO_3 (d) K_2CO_3 . (2004)
30. In which of the following processes, fused sodium hydroxide is electrolysed at a 330°C temperature for extraction of sodium?
 (a) Castner's process (b) Down's process
 (c) Cyanide process (d) Both 'b' and 'c'. (2000)
31. When a substance (A) reacts with water it produces a combustible gas (B) and a solution of substance (C) in water. When another substance (D) reacts with this solution of (C), it also produces the same gas (B) on warming but (D) can produce gas (B) on reaction with dilute sulphuric acid at room temperature. Substance (A) imparts a deep golden yellow colour to a smokeless flame of Bunsen burner. Then (A), (B), (C) and (D) respectively are
 (a) Ca , H_2 , $\text{Ca}(\text{OH})_2$, Sn
 (b) K , H_2 , KOH , Al
 (c) Na , H_2 , NaOH , Zn
 (d) CaC_2 , C_2H_2 , $\text{Ca}(\text{OH})_2$, Fe (1998)
32. Calcium is obtained by the
 (a) electrolysis of solution of calcium chloride in water
 (b) electrolysis of molten anhydrous calcium chloride
 (c) roasting of limestone
 (d) reduction of calcium chloride with carbon. (1997)
33. Sodium is made by the electrolysis of a molten mixture of about 40% NaCl and 60% CaCl_2 because
 (a) Ca^{++} can reduce NaCl to Na
 (b) Ca^{++} can displace Na from NaCl
 (c) CaCl_2 helps in conduction of electricity
 (d) this mixture has a lower melting point than NaCl . (1995)
34. The solubility in water of sulphate down the Be group is $\text{Be} > \text{Mg} > \text{Ca} > \text{Sr} > \text{Ba}$. This is due to
 (a) decreasing lattice energy
 (b) high heat of solvation for smaller ions like Be^{2+}
 (c) increase in melting points
 (d) increasing molecular weight. (1995)
35. Identify the correct statement.
 (a) Plaster of Paris can be obtained by hydration of gypsum.
 (b) Plaster of Paris is obtained by partial oxidation of gypsum.
 (c) Gypsum contains a lower percentage of calcium than Plaster of Paris.
 (d) Gypsum is obtained by heating Plaster of Paris. (1995)
36. Which of the following is known as fusion mixture?
 (a) Mixture of $\text{Na}_2\text{CO}_3 + \text{NaHCO}_3$
 (b) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
 (c) Mixture of $\text{K}_2\text{CO}_3 + \text{Na}_2\text{CO}_3$
 (d) NaHCO_3 . (1994)
37. All the following substances react with water. The pair that gives the same gaseous product is
 (a) K and KO_2 (b) Na and Na_2O_2
 (c) Ca and CaH_2 (d) Ba and BaO_2 . (1994)
38. Among the following oxides, the one which is most basic is
 (a) ZnO (b) MgO
 (c) Al_2O_3 (d) N_2O_5 (1994)
39. Which of the following metal ions play an important role in muscle contraction?
 (a) K^+ (b) Na^+
 (c) Mg^{2+} (d) Ca^{2+} (1994)
40. Which of the following statement is false?
 (a) Strontium decomposes water readily than beryllium.

- (b) Barium carbonate melts at a higher temperature than calcium carbonate.
 (c) Barium hydroxide is more soluble in water than magnesium hydroxide.
 (d) Beryllium hydroxide is more basic than barium hydroxide. (1994)
- 41.** Which one of the following has minimum value of cation/anion ratio?
 (a) NaCl (b) KCl
 (c) MgCl₂ (d) CaF₂ (1993)
- 42.** Which of the following has largest size?
 (a) Na (b) Na⁺
 (c) Na⁻ (d) Can't be predicted. (1993)
- 43.** Which compound will show the highest lattice energy?
 (a) RbF (b) CsF
 (c) NaF (d) KF (1993)
- 44.** Strongest bond is in between
 (a) CsF (b) NaCl
 (c) both (a) and (b)
 (d) none of the above. (1993)
- 45.** Electronic configuration of calcium atom may be written as
 (a) [Ne] 4p² (b) [Ar] 4s²
 (c) [Ne] 4s² (d) [Ar] 4p² (1992)
- 46.** Which one of the following substance is used in the laboratory for fast drying of neutral gases?
 (a) Phosphorus pentoxide
 (b) Active charcoal
 (c) Anhydrous calcium chloride
 (d) Na₃PO₄ (1992)
- 47.** Compared with the alkaline earth metals, the alkali metals exhibit
 (a) smaller ionic radii
 (b) highest boiling points
 (c) greater hardness
 (d) lower ionization energies. (1990)
- 48.** Washing soda has formula
 (a) Na₂CO₃·7H₂O (b) Na₂CO₃·10H₂O
 (c) Na₂CO₃·3H₂O (d) Na₂CO₃ (1990)
- 49.** Which one of the following properties of alkali metals increases in magnitude as the atomic number rises?
 (a) Ionic radius (b) Melting point
 (c) Electronegativity
 (d) First ionization energy (1989)
- 50.** Which of the following atoms will have the smallest size?
 (a) Mg (b) Na
 (c) Be (d) Li (1989)

Answer Key

1. (c) 2. (c) 3. (c) 4. (a) 5. (c) 6. (b) 7. (c) 8. (a) 9. (c) 10. (c)
 11. (c) 12. (b) 13. (c) 14. (b) 15. (b) 16. (b) 17. (a) 18. (b) 19. (a) 20. (c)
 21. (a) 22. (d) 23. (d) 24. (b) 25. (a) 26. (a) 27. (a) 28. (c) 29. (b) 30. (a)
 31. (c) 32. (b) 33. (d) 34. (b) 35. (c) 36. (c) 37. (c) 38. (b) 39. (d) 40. (d)
 41. (c) 42. (c) 43. (c) 44. (a) 45. (b) 46. (a) 47. (d) 48. (b) 49. (a) 50. (c)
-

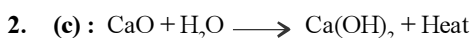
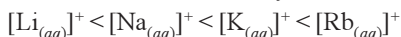
EXPLANATIONS

1. (c) : The hydration enthalpy of alkali metal ions decreases with increase in ionic sizes *i.e.*,



Hence, lithium having maximum degree of hydration will be least mobile.

The order of ionic mobility is



Quick lime Slaked lime

This process is known as slaking of lime.

The paste of lime in water (*i.e.*; suspension) is called milk of lime while the filtered and clear solution is known as lime water.

3. (c) : Beryllium salts are readily hydrolysed.

4. (a) : Ca^{2+} ions are required to trigger the contraction of muscles and to maintain the regular beating of the heart.

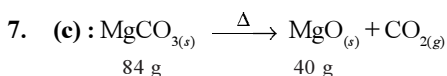
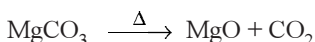
5. (c) : Read Ca(CN)_2 as CaCN_2 .



Nitrolim

6. (b) : Stability of carbonates increases down the group with increase in the size of metal ion. Also the alkali metal carbonates are more stable than alkaline earth metal carbonates.

Hence, MgCO_3 is least stable and it releases CO_2 most easily.



84 g 40 g

84 g of $\text{MgCO}_3 \equiv 40$ g of MgO

$$\therefore 20 \text{ g of MgCO}_3 \equiv \frac{40}{84} \times 20$$

$$= 9.52 \text{ g of MgO}$$

Actual yield = 8 g of MgO

$$\therefore \% \text{ purity} = \frac{8}{9.52} \times 100 = 84\%$$

8. (a)

9. (c) : Solubility of alkaline earth metal sulphates decreases down the group because hydration energy decreases.

10. (c) : In Castner-Kellner cell, sodium amalgam is formed at mercury cathode.

11. (c) : When alkali metals heated in atmosphere of oxygen, the alkali metals ignite and form oxides. On combustion Li forms Li_2O ; sodium gives the peroxide Na_2O_2 and potassium and rubidium give super oxide (MO_2).

12. (b)

13. (c) : As the covalent character in compound increases and ionic character decreases, melting point of the compound decreases. So, CaI_2 has the highest covalent character and lowest melting point.

14. (b) : Active ingredient in bleaching powder for bleaching action is Ca(OCI)_2 .

15. (b) : Plaster of Paris	- $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
Epsomite	- $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
Kieserite	- $\text{MgSO}_4 \cdot \text{H}_2\text{O}$
Gypsum	- $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

16. (b) : The hydration enthalpy of BeSO_4 is higher than its lattice energy. Within group 2, the hydration energy decreases down the group while lattice energy is almost the same.

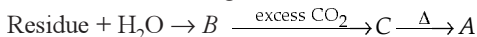
17. (a) : The solubility of an ionic compound depends on two factors :

(a) lattice energy, and (b) hydration energy

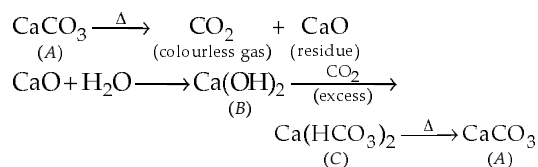
In case of alkaline metal hydroxides, the lattice energy decreases as we move down the group. This decrease is more than the decrease in the hydration energy down the group.

18. (b) : BaO_2 has peroxide linkage.

19. (a) : The reactions can be summarised as follows:



This is possible only when A is CaCO_3 . The reactions are as follows :



20. (c) : Alkali metals are highly electropositive and halogens are electronegative. Thus for the halides of a given alkali metal, the covalent character decreases with increase in electronegativity of halogens.

∴ Order of covalent character of halides is

$MI > MBr > MCl > MF$.

21. (a) : CaO being a basic oxide does not react with NaOH, however SiO_2 (acidic oxide), BeO (amphoteric oxide) and B_2O_3 (acidic oxide) react with NaOH.

22. (d) : Equimolar solutions of the given chlorides when prepared in water forms their respective hydroxides.

$Be(OH)_2$ is amphoteric, but the hydroxides of other alkaline earth metals are basic. The basic strength increases down the group. Hence higher the basic character higher will be the pH.

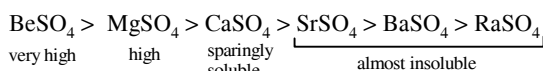
23. (d) : Smaller the size of cation, higher will be the hydration and its effective size will increase and hence mobility in aqueous solution will decrease. Larger size ions have more ionic mobility due to less hydration. Thus the degree of hydration of M^+ ions decreases from Li^+ to Cs^+ . Consequently the radii of the hydrated ion decreases from Li^+ to Cs^+ . Hence the ionic conductance of these hydrated ions increases from Li^+ to Cs^+ .

24. (b) : The ionic character of the bonds in hydrides increases from LiH to CsH so thermal stability of these hydrides decreases in the order of $LiH > NaH > KH > RbH > CsH$

25. (a) : In all cases, for a particular set of e.g. Group 1 or Group 2 compounds, the thermal stability increases down the group as the ionic radius of the cation increases, and its polarising power decreases.

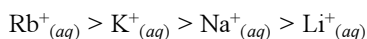
Group 1 compounds tend to be more thermally stable than group 2 compounds because the cation has a smaller charge and a larger ionic radius, and so a lower polarising power, particularly when adjacent metals on the same period are compared. Hence, the order of increasing thermal stability of K_2CO_3 , $MgCO_3$, $CaCO_3$ and $BeCO_3$ is $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$.

26. (a) : When hydration energy exceeds lattice energy, the compound becomes soluble in water. The solubility of alkaline earth metal sulphates decreases in the order



The solubilities of $BeSO_4$ and $MgSO_4$ are due to high energy of solvation of smaller Be^{2+} and Mg^{2+} ions.

27. (a) : The alkali metal ions exist as hydrated ions $M^+(H_2O)_x$ in the aqueous solution. The degree of hydration, however, decreases with the ionic size as we move from Li^+ to Cs^+ . In other words, Li^+ ion is most highly hydrated. e.g. $[Li(H_2O)_6]^+$. Since the mobility of ion is inversely proportional to the size of their hydrated ions, therefore, amongst the alkali metal ions, lithium has the lowest ionic mobility.



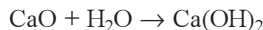
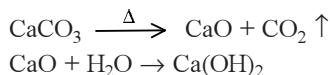
28. (c) : Covalent character in a compound is found by Fajan's Rule.

Fajan's Rule :

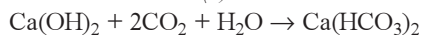
- Greater the size of the cation more will be the ionic character and
- Greater the size of anion more will be its covalent character and charge on the cation is dominant over the size of the cation.
- Greater the charge on the cation more will be its covalent character.

Hence, $BeCl_2 > LiCl > NaCl$ (In Covalent character).

29. (b) : The given compound X must be $CaCO_3$. It can be explained by following reactions:



(Y)



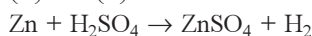
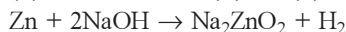
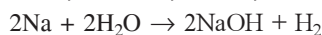
(Z)



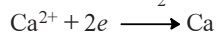
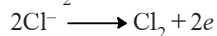
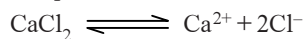
(X)

30. (a) : In Castner's process, for production of sodium metal, sodium hydroxide (NaOH) is electrolysed at temperature 330°C .

31. (c) : Only 'Na' imparts golden colour to bunsen flame, therefore, $A = Na$, $B = H_2$, $C = NaOH$, $D = Zn$.



32. (b) : Calcium is obtained by electrolysis of a fused mass consisting six parts calcium chloride and one part calcium fluoride at about 700°C.



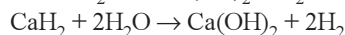
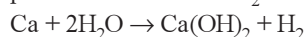
33. (d) : Sodium is obtained by electrolytic reduction of its chloride. Melting point of chloride of sodium is high so in order to lower its melting point, calcium chloride is added to it.

34. (b) : As we move down the group from BeSO_4 to BaSO_4 the enthalpy of hydration of the positive ion becomes smaller due to increase in ionic size. Salts of heavier metal ions are less soluble than those of lighter ions.

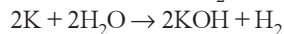
35. (c) : Gypsum is $\text{CaSO}_4 \cdot \text{H}_2\text{O}$ and Plaster of Paris is $(\text{CaSO}_4)_2 \cdot \text{H}_2\text{O}$. Therefore gypsum contains a lower percentage of calcium than Plaster of Paris.

36. (c) : K_2CO_3 and Na_2CO_3 mixture is called as fusion mixture.

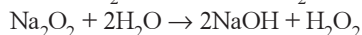
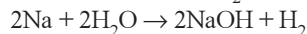
37. (c) : The pair which gives the same gaseous product is Ca and CaH_2 .



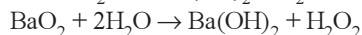
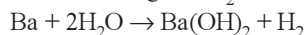
Whereas, K gives H_2 while KO_2 gives O_2 and H_2O_2 .



Similarly, Na gives H_2 , while Na_2O_2 gives H_2O_2 .



Likewise Ba gives H_2 while BaO_2 gives H_2O_2 .



38. (b) : Al_2O_3 and ZnO are amphoteric. N_2O_5 is strongly acidic.

39. (d) : Calcium is an essential element for the contraction of muscles. In the presence of calcium ions and energy from ATP, actin and myosin (contractile proteins) interact forming actomyosin which causes contraction of muscles.

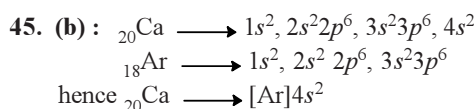
40. (d) : Beryllium hydroxide although amphoteric, is however less basic than barium hydroxide.

41. (c) : The order of ionic size for given ions will be $\text{K}^+ > \text{Ca}^{2+} > \text{Mg}^{2+}$ and that of $\text{Cl}^- > \text{F}^-$. Therefore $\text{Mg}^{2+}/\text{Cl}^-$ has minimum value of cation/anion ratio.

42. (c) : The cations are always smaller than the neutral atom and anions are always larger in size $\text{Na}^- > \text{Na} > \text{Na}^+$

43. (c) : With the same anion, smaller the size of the cation, higher is the lattice energy. Therefore, NaF will show the highest lattice energy among the given compounds.

44. (a) : According to Fajan rules, ionic character increases with increase in size of the cation ($\text{Cs} > \text{Rb} > \text{K} > \text{Na}$) and with decrease in size of the anion ($\text{F} > \text{Cl} > \text{Br} > \text{I}$). Thus, CsF has higher ionic character than NaCl and hence bond in CsF is stronger than in NaCl.



46. (a) : P_2O_5 absorbs moisture much readily than anhydrous CaCl_2 .

47. (d) : The alkali metals are larger in size and have smaller nuclear charge thus they have lower ionization energy in comparison to alkaline earth metals.

48. (b) : $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ is washing soda.

49. (a) : In a group, ionic radius increases with increase in atomic number whereas the m.pt. decreases down in a group due to weakening of metallic bond. Similarly, electronegativity and the ionization energy also decreases down the group.

50. (c) : The atomic size decreases within a period from left to right, therefore $\text{Li} > \text{Be}$ and $\text{Na} > \text{Mg}$. The size increases in a group from top to bottom. Hence, the size of Na is greater than Li. Overall order $\text{Na} > \text{Mg} > \text{Li} > \text{Be}$

Thus, Be has smallest size.

