

# THE S-BLOCK ELEMENTS

## CHEMISTRY

### Single Correct Answer Type

- $\text{KO}_2$  is used in space and submarines because it
  - Absorbs  $\text{CO}_2$  and increases  $\text{O}_2$  concentration
  - Absorbs moisture
  - Absorbs  $\text{CO}_2$
  - Produces ozone
- A metal  $M$  readily forms its sulphate  $\text{MSO}_4$  which is water soluble. It forms its oxide  $\text{MO}$  which becomes inert on heating. It forms its insoluble hydroxide  $\text{M}(\text{OH})_2$  which is soluble in  $\text{NaOH}$  solution. Then,  $M$  is
  - Be
  - Ba
  - Ca
  - Mg
- Which of the following exists in polymeric form?
  - $\text{AlCl}_3$
  - $\text{BeCl}_2$
  - $\text{B}_2\text{H}_6$
  - $\text{SiC}$
- The element which on burning in air gives peroxide is
  - Lithium
  - Sodium
  - Rubidium
  - Caesium
- Electric cookers have a coating of ....that protects them against fire.
  - Heavy lead
  - Magnesium oxide
  - Zinc oxide
  - Sodium sulphate
- Limestone is not used in which of the following manufacturing processes?
  - Phosphorus from phosphorite
  - Ordinary (soda lime) glass
  - Iron from haematite
  - Solvay process of sodium carbonate
- $\text{Na}_2\text{S}_2\text{O}_3$  is reduced by  $\text{I}_2$  to
  - $\text{Na}_2\text{S}$
  - $\text{Na}_2\text{SO}_4$
  - $\text{NaHSO}_3$
  - $\text{Na}_2\text{S}_4\text{O}_6$
- If  $\text{CO}_2$  is passed in excess into lime water, the milkiness first formed disappears due to:
  - Reversal of original reaction
  - Formation of volatile calcium derivative
  - Formation of soluble calcium bicarbonate
  - Formation of soluble magnesium hydroxide
- Which of the following compounds is a peroxide:
  - $\text{KO}_2$
  - $\text{BaO}_2$
  - $\text{MnO}_2$
  - $\text{NO}_2$
- Milk of lime is:
  - $\text{CaCO}_3$
  - $\text{CaHCO}_3$
  - $\text{Ca}(\text{OH})_2$
  - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- Initial setting of cement is mainly due to
  - Hydration and gel formation
  - Dehydration and gel formation
  - Hydration and hydrolysis
  - Dehydration and oxidation
- Celestine is an ore of:
  - Ba
  - Ca
  - Sr
  - Mg
- Phosphine, acetylene and ammonia can be formed by treating water with
  - $\text{Mg}_3\text{P}_2, \text{Al}_4\text{C}_3, \text{Li}_3\text{N}$
  - $\text{Ca}_3\text{P}_2, \text{CaC}_2, \text{Mg}_3\text{N}_2$
  - $\text{Ca}_3\text{P}_2, \text{CaC}_2, \text{CaCN}_2$
  - $\text{Ca}_3\text{P}_2, \text{Mg}_2\text{C}, \text{NH}_4\text{NO}_3$
- Magnesia is:
  - $\text{MgO}$
  - $\text{CuSO}_4$
  - $\text{FeSO}_4$
  - $\text{MgSO}_4$
- Which one of the following processes is used for manufacture of calcium?
  - Reduction of  $\text{CaO}$  with carbon
  - Reduction of  $\text{CaO}$  with hydrogen
  - Electrolysis of a mixture of anhydrous  $\text{CaCl}_2$  and  $\text{KCl}$
  - Electrolysis of molten  $\text{Ca}(\text{OH})_2$

16. Which substance gives a different flame colouration from the others?  
 a) Nitre                                      b) Caustic potash                                      c) Potassium chloride                                      d) Table salt
17. An alloy of Na + K is:  
 a) Liquid at room temperature  
 b) Used in specially designed thermometers  
 c) Both (a) and (b)  
 d) None of the above
18. Carnallite is  
 a)  $\text{MgCO}_3 \cdot \text{CaCO}_3$                                       b)  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$                                       c)  $\text{KAlSi}_3\text{O}_8$                                       d)  $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
19. Sodium carbonate solution in water is alkaline due to:  
 a) Hydrolysis of  $\text{Na}^+$   
 b) Hydrolysis of  $\text{CO}_3^{2-}$   
 c) Hydrolysis of both  $\text{Na}^+$  and  $\text{CO}_3^{2-}$  ions  
 d) None of the above
20. Which of the following reaction does not liberate gaseous product?  
 a)  $\text{AlCl}_3 + \text{NaOH} \rightarrow$                                       b)  $\text{NaOH} + \text{P}(\text{white}) + \text{H}_2\text{O} \rightarrow$   
 c)  $\text{Al} + \text{NaOH} \xrightarrow{\Delta}$                                       d)  $\text{Zn} + \text{NaOH} \xrightarrow{\Delta}$
21. When one mole of bleaching powder is completely decomposed in presence of  $\text{CO}_2$  then the mass of chlorine gas that is liberated will be:  
 a) 35.45 g                                      b) 70.90 g                                      c) 17.72 g                                      d) 88.60 g
22. Which of the following compounds on reaction with  $\text{NaOH}$  and  $\text{H}_2\text{O}_2$  gives yellow colour?  
 a)  $\text{Zn}(\text{OH})_2$                                       b)  $\text{Cr}(\text{OH})_3$                                       c)  $\text{Al}(\text{OH})_3$                                       d) None of these
23. Which of the following compounds has the lowest melting point?  
 a)  $\text{CaF}_2$                                       b)  $\text{CaCl}_2$                                       c)  $\text{CaBr}_2$                                       d)  $\text{CaI}_2$
24. The outermost electron is most loosely held in:  
 a) Li                                      b) Na                                      c) K                                      d) Cs
25. On heating quick lime with coke in an electric furnace we get:  
 a) Ca and  $\text{CO}_2$                                       b)  $\text{CaCO}_3$                                       c) CaO                                      d)  $\text{CaC}_2$
26. Which salt will not impart colour to flame?  
 a) LiCl                                      b)  $\text{MgCl}_2$                                       c)  $\text{CaCl}_2$                                       d) KI
27. Shine at freshly cut sodium is because of  
 a) Due to oscillation of free electrons                                      b) Due to weak metallic bonding  
 c) Due to by absorption of light in crystal lattice                                      d) Due to presence of free valency at the surface
28. Ionic compound  $\text{BaSO}_4$  is insoluble in water due to  
 a) High lattice energy                                      b) Low lattice energy  
 c) Low hydration energy                                      d) Both (a) and (c)
29. Gypsum is added to clinker during cement manufacture to:  
 a) Decrease the rate of setting of cement  
 b) Make the cement impervious  
 c) Bind the particles of calcium silicate  
 d) To facilitate the formation of colloidal gel
30. Amongst the following hydroxides, the one which has the lowest value of  $K_{sp}$  is:  
 a)  $\text{Mg}(\text{OH})_2$                                       b)  $\text{Ca}(\text{OH})_2$                                       c)  $\text{Ba}(\text{OH})_2$                                       d)  $\text{Be}(\text{OH})_2$
31. Which is most basic in character?  
 a) CsOH                                      b) KOH                                      c) NaOH                                      d) LiOH
32. Which of the following acts as reducing agent as well as oxidising agent?  
 a)  $\text{Na}_2\text{O}$                                       b)  $\text{Na}_2\text{O}_2$                                       c)  $\text{NaNO}_3$                                       d)  $\text{KNO}_3$
33. Which of the following is correct?  
 a) In the Castner's process of sodium extraction, NaCl is used as an electrolyte.  
 b) Sodium reduces  $\text{CO}_2$  to carbon.

- c) Mg reacts with cold water and liberate hydrogen gas.  
d) Magnalium is an alloy of Mg and Zn.
34. Which is quick lime?  
a)  $\text{CaCO}_3$                       b)  $\text{Ca(OH)}_2 + \text{H}_2\text{O}$                       c)  $\text{Ca(OH)}_2$                       d)  $\text{CaO}$
35. Pearl ash and caustic potash are chemically:  
a)  $\text{K}_2\text{CO}_3$  and  $\text{KOH}$                       b)  $\text{KOH}$  and  $\text{K}_2\text{CO}_3$                       c)  $\text{Na}_2\text{CO}_3$  and  $\text{KOH}$                       d)  $\text{Na}_2\text{CO}_3$  and  $\text{NaOH}$
36. When sodium is heated in flame it gives:  
a) Golden yellow colour    b) Crimson red colour    c) Brick red colour    d) Violet colour
37. Among the following, which has minimum solubility in water?  
a)  $\text{KOH}$                       b)  $\text{CsOH}$                       c)  $\text{LiOH}$                       d)  $\text{RbOH}$
38. On strong heating  $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ , the product obtained is  
a)  $\text{MgCl}_2$                       b)  $\text{MgO}$                       c)  $\text{MgCl}_2 \cdot 2\text{H}_2\text{O}$                       d)  $\text{MgCl}_2 \cdot 4\text{H}_2\text{O}$
39. Sodium chloride imparts a golden yellow colour to the Bunsen flame. This can be interpreted due to:  
a) Low ionization potential of sodium  
b) Photosensitivity of sodium  
c) Sublimation of metallic sodium to give yellow vapour  
d) Emission of excess of energy absorbed as a radiation in the visible region
40. Which property increases in magnitude as the atomic number of alkali metals increases?  
a) Electronegativity  
b) First ionization energy  
c) Ionic radius  
d) Melting point
41. Bleaching powder is obtained by the interaction of chlorine and  
a) Dry calcium oxide                      b) Dry slaked lime  
c) conc. solution of  $\text{Ca(OH)}_2$                       d) dilute solution of  $\text{Ca(OH)}_2$
42. Ca, Sr and Ba dissolve in liquid ammonia giving a.....  
a) Highly conducting    b) Highly reducing    c) Paramagnetic    d) All are correct
43. The ionic conductances of following cations in a given concentration are in the order  
a)  $\text{Li}^+ < \text{Na}^+ < \text{K}^+ < \text{Rb}^+$                       b)  $\text{Li}^+ > \text{Na}^+ > \text{K}^+ > \text{Rb}^+$   
c)  $\text{Li}^+ < \text{Na}^+ > \text{K}^+ > \text{Rb}^+$                       d)  $\text{Li}^+ = \text{Na}^+ < \text{K}^+ < \text{Rb}^+$
44. Which can undergo both oxidation and reduction?  
a)  $\text{Ba}^{2+}$                       b)  $\text{BaCl}_2$                       c)  $\text{Ba}^+$                       d)  $\text{BaH}_2$
45. Which component of cement sets at the slowest rate?  
a) Dicalcium silicate  
b) Tricalcium silicate  
c) Tricalcium aluminate  
d) Tetracalcium aluminoferrite
46. Scarlet flame colour of Bunsen flame is characteristic of:  
a) Sn                      b) K                      c) Sb                      d) Sr
47. Which pair of the following chlorides do not impart colour to the flame?  
a)  $\text{BeCl}_2$  and  $\text{SrCl}_2$                       b)  $\text{BeCl}_2$  and  $\text{MgCl}_2$                       c)  $\text{CaCl}_2$  and  $\text{BaCl}_2$                       d)  $\text{BaCl}_2$  and  $\text{SrCl}_2$
48. Which one of the following electrolytes is used in Down's process of extracting sodium metal?  
a)  $\text{NaCl} + \text{KCl} + \text{KF}$                       b)  $\text{NaCl}$                       c)  $\text{NaOH} + \text{KCl} + \text{KF}$                       d)  $\text{NaCl} + \text{NaOH}$
49. When  $\text{KCl}$  is heated with conc.  $\text{H}_2\text{SO}_4$  and solid  $\text{K}_2\text{Cr}_2\text{O}_7$ , we get:  
a) Chromyl chloride    b) Chromous chloride    c) Chromic chloride    d) Chromic oxide
50. In the presence of cobalt chloride, bleaching powder decomposes to form  
a)  $\text{CaCO}_3$  and  $\text{O}_3$                       b)  $\text{ClO}_2$  and  $\text{CaO}$                       c)  $\text{Cl}_2\text{O}$  and  $\text{CaO}$                       d)  $\text{CaCl}_2$  and  $\text{O}_2$
51. The highest oxidation potential stands for:  
a) Li                      b) Be                      c) Ba                      d) Ra
52. The compound X on heating gives a colourless gas. The residue is dissolved in water to obtain Y. Excess

- CO<sub>2</sub> is bubbled through aqueous solution of Y, Z is formed. Z on gentle heating gives back X. The compound X is:
- a) CaCO<sub>3</sub>                      b) Na<sub>2</sub>CO<sub>3</sub>                      c) CaSO<sub>4</sub> · 2H<sub>2</sub>O                      d) K<sub>2</sub>CO<sub>3</sub>
53. KO<sub>2</sub> is used in oxygen cylinder in space air craft and submarines because it:
- a) Absorbs CO<sub>2</sub> and increase O<sub>2</sub> content  
 b) Eliminate moisture  
 c) Absorbs CO<sub>2</sub>  
 d) Produces O<sub>2</sub>
54. The oxide, which is best soluble in H<sub>2</sub>O is
- a) Ba(OH)<sub>2</sub>                      b) Sr(OH)<sub>2</sub>                      c) Ca(OH)<sub>2</sub>                      d) Mg(OH)<sub>2</sub>
55. Melting point is highest for:
- a) Be                      b) Mg                      c) Sr                      d) Ca
56. On dissolving moderate amount of sodium metal in liquid NH<sub>3</sub> at low temperature, which one of the following does not occur?
- a) Blue coloured solution is obtained  
 b) Na<sup>+</sup> ions are formed in solution  
 c) Liquid ammonia becomes good conductor of electricity  
 d) Liquid NH<sub>3</sub> remains diamagnetic
57. Which ion forms hydroxide easily soluble in water?
- a) Zn<sup>2+</sup>                      b) Ba<sup>2+</sup>                      c) Mg<sup>2+</sup>                      d) Al<sup>3+</sup>
58. One of the important use of quicklime is:
- a) As a purgative  
 b) In bleaching silk  
 c) In drying gases and alcohol  
 d) In dyeing cotton
59. Which out of the following statements is not correct for anhydrous calcium chloride?
- a) It is prepared by heating hydrated calcium chloride above 533 K  
 b) It is used for drying alcohols and NH<sub>3</sub>  
 c) It is used as a dehydrating agent to control snow and ice on highway and pavements  
 d) When mixed in concrete, it gives quicker initial setting and improves its strength
60. On heating washing soda, we get:
- a) CO                      b) CO + CO<sub>2</sub>                      c) CO<sub>2</sub>                      d) H<sub>2</sub>O(v)
61. Sodium forms Na<sup>+</sup> and not Na<sup>2+</sup> because:
- a) Sodium contains only one electron in outermost shell  
 b) First ionization potential is small and the difference in first and second ionization potentials is very large  
 c) Radius of Na<sup>+</sup> is much smaller than of Na<sup>+</sup>  
 d) None of the above
62. Na<sub>2</sub>CO<sub>3</sub> can be manufactured by Solvay process but K<sub>2</sub>CO<sub>3</sub> cannot be prepared because:
- a) K<sub>2</sub>CO<sub>3</sub> is more soluble  
 b) K<sub>2</sub>CO<sub>3</sub> is less soluble  
 c) KHCO<sub>3</sub> is more soluble than NaHCO<sub>3</sub>  
 d) KHCO<sub>3</sub> is less soluble than NaHCO<sub>3</sub>
63. Which of the following is incorrect?
- a) Mg burns in air releasing dazzling light rich in UV rays  
 b) CaCl<sub>2</sub> · 6H<sub>2</sub>O when mixed with ice gives, freezing mixture  
 c) Mg cannot form complexes  
 d) Be can form complexes due to its very small size
64. When sodium chloride solution is electrolysed, the gas that is liberated at the cathode is
- a) Oxygen                      b) Chlorine                      c) Hydrogen                      d) Air

65. Manufacture of NaOH is done by:
- Castner- Kellner process
  - Solvay process
  - Brine process
  - Mond's process
66. Which one of the following statements is true for all the alkali metals?
- Their nitrates decompose on heating to give  $\text{NO}_2$  and  $\text{O}_2$ .
  - Their carbonates decompose on heating to give  $\text{CO}_2$  and the metal oxide.
  - They react with oxygen to give mainly the oxide  $\text{M}_2\text{O}$ .
  - They react with halogens to give the halides  $\text{MX}$ .
67. Strongest reducing agent among the following is:
- K
  - Na
  - Al
  - Mg
68. The compound which is not soluble in dil. HCl is:
- $\text{BaSO}_4$
  - MnS
  - ZnS
  - $\text{BaCO}_3$
69. Which alkali metal is most metallic in character?
- Li
  - Na
  - K
  - Cs
70. KI and  $\text{CuSO}_4$  solution when mixed, give
- $\text{CuI}_2 + \text{K}_2\text{SO}_4$
  - $\text{Cu}_2\text{I}_2 + \text{K}_2\text{SO}_4$
  - $\text{K}_2\text{SO}_4 + \text{Cu}_2\text{I}_2 + \text{I}_2$
  - $\text{K}_2\text{SO}_4 + \text{CuI}_2 + \text{I}_2$
71. Sodium is manufactured by the electrolysis of a fused mixture of sodium and calcium chlorides in a steel cell using a graphite anode and an iron cathode. Calcium is not liberated since:
- It belongs to a higher group in the periodic table
  - It combines with the liberated chlorine to form calcium chloride again
  - Its discharge potential under these conditions is higher than that of sodium
  - It is more readily fusible than sodium chloride
72. One mole of magnesium nitride on the reaction with excess water gives:
- Two mole of nitric acid
  - One mole of nitric acid
  - Two mole of ammonia
  - One mole of ammonia
73. Which of the following statements is correct for  $\text{CsBr}_3$ ?
- It is a covalent compound
  - It contains  $\text{Cs}^{2+}$  and  $\text{Br}^-$  ions
  - It contains  $\text{Cs}^+$ ,  $\text{Br}^-$  and  $\text{Br}_2$  lattice molecules
  - It contains  $\text{Cs}^+$  and  $\text{Br}_3^-$  ions
74. Which of the following is known as dead burnt plaster?
- Gypsum
  - Plaster of Paris
  - Anhydrite
  - None of these
75. Which of the compounds of cement sets at the slowest rate?
- Dicalcium silicate
  - Tricalcium silicate
  - Tricalcium aluminate
  - Tetracalcium aluminoferrate
76. The alkali metal that reacts with nitrogen directly to form nitride is
- Li
  - K
  - Na
  - Rb
77. Alkali metals are powerful reducing agents because:
- These are metals
  - These are monovalent
  - Their ionic radii is large
  - Of low ionisation enthalpy
78. Elements of group 1 and group VI in the periodic table have one thing common. That is with the increasing atomic number, the:

- a) Maximum valency increases  
b) Reactivity increases  
c) Atomic radius increases  
d) Oxidizing power increases
79. The solubility in water of sulphates down the Be group is  $\text{Be} > \text{Mg} > \text{Ca} > \text{Sr} > \text{Ba}$ . This is due to:  
a) Increase in m. p.  
b) High ionisation energy  
c) Higher co-ordination number  
d) All of the above
80. The non-metal which is not affected by NaOH:  
a) C                                      b) Si                                      c) P                                      d) S
81. Beryllium shows diagonal relationship with aluminium. Which of the following similarity is incorrect?  
a)  $\text{Be}_2\text{C}$  like  $\text{AlC}_3$  yields methane on hydrolysis  
b) Be like Al is rendered passive by  $\text{HNO}_3$   
c)  $\text{Be}(\text{OH})_2$  like  $\text{Al}(\text{OH})_3$  is basic  
d) Be forms beryllates and Al forms aluminates
82. Which statement is correct for alkaline earth metals?  
a) They are diatomic and form ions of the type  $M^{2-}$   
b) They are highly electronegative elements  
c) They are monoatomic and form ions of the type  $M^{2+}$   
d) They are diatomic and form ions of the type  $M^{2+}$
83. Milk of magnesia is used as  
a) Antichlor                              b) Antacid                              c) Antiseptic                              d) Food preservative
84. In a sodium chloride crystal, each chloride ion is surrounded by:  
a)  $4\text{Na}^+$  ions                              b)  $6\text{Na}^+$  ions                              c)  $1\text{Na}^+$  ion                              d)  $2\text{Na}^+$  ions
85. Alkaline earth metals are denser than alkali metals, because metallic bonding in alkaline earth's metal is  
a) Weaker                              b) Stronger                              c) Volatile                              d) Not present
86. The ion having maximum value of hydration energy is:  
a)  $\text{Li}^+$                               b)  $\text{Na}^+$                               c)  $\text{K}^+$                               d)  $\text{Cs}^+$
87. Magnesium metal is prepared by:  
a) Reduction of MgO by coke  
b) Electrolysis of aqueous solution of  $\text{Mg}(\text{NO}_3)_2$   
c) Displacement of Mg by iron from magnesium sulphate solution  
d) Electrolysis of molten magnesium chloride
88. Which of the following hydroxides is amphoteric in nature?  
a)  $\text{Be}(\text{OH})_2$                               b)  $\text{Mg}(\text{OH})_2$                               c)  $\text{Ca}(\text{OH})_2$                               d)  $\text{Ba}(\text{OH})_2$
89. Black ash is:  
a)  $\text{NaOH} + \text{CaS}$                               b)  $\text{NaHCO}_3 + \text{CoS}$                               c)  $\text{Na}_2\text{CO}_3 + \text{CaS}$                               d)  $\text{Na}_2\text{CO}_3 + \text{CoS}$
90. Sodium carbonate is:  
a) Efflorescent                              b) Deliquescent                              c) Hygroscopic                              d) Oxidant
91. How many elements are included in IA group?  
a) 4                              b) 5                              c) 6                              d) 7
92. Which category of salts of alkaline earth metals is not found in solid state, but found in solution state?  
a) Carbonates                              b) Bicarbonates                              c) Hydroxides                              d) Sulphates
93.  $\text{K}_2\text{CS}_3$  can be called as potassium:  
a) Sulphocyanide                              b) Thiocarbide                              c) Thiocarbonate                              d) Thiocyanate
94. Which is not true in respect of beryllium chemistry?  
a) Beryllium is amphoteric                              b) It forms unusual carbide  $\text{Be}_2\text{C}$   
c)  $\text{Be}(\text{OH})_2$  is basic                              d) Beryllium halides are electron deficient
95. A and B are two salts. A with dilute HCl and B with conc.  $\text{H}_2\text{SO}_4$  react to give reddish brown vapours,

- hence *A* and *B* respectively are:
- a) NaBr, NaNO<sub>3</sub>      b) NaNO<sub>3</sub>, NaBr      c) NaBr, NaNO<sub>2</sub>      d) NaNO<sub>2</sub>, NaBr
96. On strong heating CaO and C, the products formed are:  
a) Ca and CO      b) CaC<sub>2</sub> and CO      c) Ca(OH)<sub>2</sub>      d) CaC<sub>2</sub> and CO<sub>2</sub>
97. For which one of the following minerals, the composition given is incorrect?  
a) Glauber's salt - Na<sub>2</sub>SO<sub>4</sub> . 10H<sub>2</sub>O      b) Borax - Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub> . 7H<sub>2</sub>O  
c) Carnallite - KCl . MgCl<sub>2</sub> . 6H<sub>2</sub>O      d) Soda ash - Na<sub>2</sub>CO<sub>3</sub>
98. The stability of the following alkali metal chlorides follows the order:  
a) LiCl > KCl > NaCl > CsCl  
b) CsCl > KCl > NaCl > LiCl  
c) NaCl > KCl > LiCl > CsCl  
d) KCl > CsCl > NaCl > LiCl
99. The solubility of alkali metal hydroxide is  
a) LiOH < KOH < NaOH < RbOH < CsOH      b) LiOH < NaOH < KOH < RbOH < CsOH  
c) CsOH < RbOH < KOH < NaOH < LiOH      d) None of the above
100. Which of the statements is not true?  
a) K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution in acidic medium is orange  
b) K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution becomes yellow on increasing the pH beyond 7  
c) On passing H<sub>2</sub>S through acidified K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution, a milky colour is observed  
d) Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> is preferred over K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> in volumetric analysis
101. Gypsum, CaSO<sub>4</sub> . 2H<sub>2</sub>O on heating to about 120°C forms a compound which has the chemical composition represented by  
a) CaSO<sub>4</sub> . H<sub>2</sub>O      b) 2CaSO<sub>4</sub> . 3H<sub>2</sub>O      c) 2CaSO<sub>4</sub> . H<sub>2</sub>O      d) CaSO<sub>4</sub>
102. Which of the following hydrogen compounds is most ionic?  
a) HF      b) CsH      c) HI      d) LiH
103. Which sequence of reactions shows correct chemical relation between sodium and its compounds?  
a)  $\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O} \xrightarrow{\text{HCl (aq)}} \text{NaCl} \xrightarrow{\text{CO}_2} \text{Na}_2\text{CO}_3$   
b)  $\text{Na} \xrightarrow{\text{O}_2} \text{Na}_2\text{O} \xrightarrow{\text{H}_2\text{O}} \text{NaOH} \xrightarrow{\text{CO}_2} \text{Na}_2\text{CO}_3$   
c)  $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} \xrightarrow{\text{HCl}} \text{NaCl} \xrightarrow{\text{CO}_2} \text{Na}_2\text{CO}_3$   
d)  $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} \xrightarrow{\text{CO}_2} \text{Na}_2\text{CO}_3 \xrightarrow{\text{HCl}} \text{NaCl}$   
Electrolysis (molten)  $\rightarrow \text{Na} + \text{Cl}^-$
104. The salt added to table salt to make it flow freely in rainy season is:  
a) KCl      b) NH<sub>4</sub>Cl      c) Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>      d) NaHCO<sub>3</sub>
105. Lithopone is  
a) BaO + ZnSO<sub>4</sub>      b) BaS + ZnSO<sub>4</sub>      c) ZnS + BaSO<sub>4</sub>      d) ZnO + BaSO<sub>4</sub>
106. Sodium is heated in air at 300°C to form *X*. *X* absorbs CO<sub>2</sub> and forms Na<sub>2</sub>CO<sub>3</sub> and *Y*? Which of the following is *Y*?  
a) H<sub>2</sub>      b) O<sub>2</sub>      c) H<sub>2</sub>O<sub>2</sub>      d) O<sub>3</sub>
107. When Na reacts with liquid NH<sub>3</sub> the following substance is formed  
a) Na(NH<sub>3</sub>)<sub>x</sub>]<sup>-</sup>      b) [e(NH<sub>3</sub>)<sub>y</sub>]<sup>-</sup>      c) NaNH<sub>2</sub>      d) Na<sub>x</sub>(NH<sub>3</sub>)<sub>y</sub>
108. Sodium bicarbonate solution on adding to magnesium sulphate solution forms:  
a) Magnesium bicarbonate  
b) Magnesium hydroxide  
c) Basic magnesium carbonate  
d) Magnesium carbonate
109. Which pair of elements would form the most ionic bond?  
a) H, Cl      b) K, Cl      c) B, N      d) C, O
110. Magnesium wire burns in the atmosphere of CO<sub>2</sub> because:  
a) Magnesium acts as an oxidizing agent

- b) Magnesium has 2 electrons in the outermost orbit  
 c) Magnesium acts as a reducing agent and removes oxygen from  $\text{CO}_2$   
 d) None of the above
111. Potassium when heated strongly in oxygen, it forms:  
 a)  $\text{K}_2\text{O}$                                       b)  $\text{KO}_2$                                       c)  $\text{K}_2\text{O}_2$                                       d)  $\text{KO}$
112. Ordinary blackboard chalk is made up of:  
 a)  $\text{CaCO}_3$                                       b) Gypsum                                      c) Fluorspar                                      d)  $\text{Ca}_3(\text{PO}_4)_2$
113. Caustic soda solution is an absorbent for:  
 a)  $\text{NH}_3$                                       b)  $\text{CO}_2$                                       c)  $\text{CO}$                                       d)  $\text{N}_2\text{O}$
114. Which of the following represents the composition of carnallite mineral?  
 a)  $\text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$                                       b)  $\text{KNO}_3$   
 c)  $\text{K}_2\text{SO}_4 \cdot \text{MgSO}_4 \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$                                       d)  $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
115. The element that forms a solid basic oxide at room temperature is:  
 a) Mg                                      b) S                                      c) H                                      d) P
116. Which alkali metal is frequently used in solar cells?  
 a) Na                                      b) Li                                      c) K                                      d) Cs
117. Which gives apple green colour in fireworks?  
 a) Na                                      b) K                                      c) Ba                                      d) Ca
118. Sodium nitrate decomposes above  $800^\circ\text{C}$  and does not give:  
 a)  $\text{N}_2$                                       b)  $\text{O}_2$                                       c)  $\text{NO}_2$                                       d)  $\text{Na}_2\text{O}$
119. Which of the following process is used in the extractive metallurgy of magnesium?  
 a) Fused salt electrolysis  
 b) Self reduction  
 c) Aqueous solution electrolysis  
 d) Thermite reduction
120. In the replacement reaction  

$$\text{CI} + \text{MF} \rightarrow \text{CF} + \text{MI}$$
 The reaction will be most favourable if  $M$  happens to be:  
 a) Na                                      b) K                                      c) Rb                                      d) Li
121. The substance used in Holme's signal of the ship is a mixture of  
 a)  $\text{CaC}_2 + \text{Ca}_3\text{P}_2$                                       b)  $\text{Ca}_3(\text{PO}_4)_2 + \text{Pb}_3\text{O}_4$                                       c)  $\text{H}_3\text{PO}_4 + \text{CaCl}_2$                                       d)  $\text{NH}_3 + \text{HOCl}$
122. Causticisation process is used for the preparation of:  
 a) Caustic soda                                      b) Caustic potash                                      c) Baryta                                      d) Slaked lime
123. Which of the following alkali metal ion in aqueous solution is the best conductor of electricity?  
 a)  $\text{Li}^+$                                       b)  $\text{Na}^+$                                       c)  $\text{Cs}^+$                                       d)  $\text{K}^+$
124. Indian saltpetre is:  
 a)  $\text{KNO}_3$                                       b)  $\text{NaNO}_3$                                       c)  $\text{NaCl}$                                       d)  $\text{Na}_2\text{CO}_3$
125. The action of dilute  $\text{HNO}_3$  on magnesium gives:  
 a)  $\text{NO}$                                       b)  $\text{H}_2$                                       c)  $\text{NO}_2$                                       d)  $\text{NH}_4\text{NO}_3$
126. Brine is chemically:  
 a) Conc. Solution of  $\text{Na}_2\text{CO}_3$   
 b) Conc. Solution of  $\text{Na}_2\text{SO}_4$   
 c) Conc. Solution of  $\text{NaCl}$   
 d) Conc. Solution of alum
127. The atomic numbers of four elements are given below. Which is an alkaline earth metal?  
 a) 10                                      b) 20                                      c) 30                                      d) 40
128. The plaster of Paris is:  
 a)  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$                                       b)  $\text{CaSO}_4$                                       c)  $2\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$                                       d)  $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$
129. The ashes of plants contain alkali metals, 90% of which is:  
 a) Li                                      b) K                                      c) Na                                      d) Rb



130. At high temperature nitrogen combines with  $\text{CaC}_2$  to give:  
 a) Calcium cyanide      b) Calcium cyanamide      c) Calcium carbonate      d) Calcium nitride
131. Superphosphate of lime is a mixture of:  
 a) Primary calcium phosphate and Epsom  
 b) Primary magnesium phosphate and Epsom  
 c) Primary magnesium phosphate and gypsum  
 d) Primary calcium phosphate and gypsum
132. A solid is a compound of group 1 element and it gives a bright red colour in the flame test. The solid is  
 a) LiBr      b) CsCl      c) KCl      d) NaCl
133. When sodium metal is dissolved in liquid ammonia, a blue solution is formed. The blue colour is due to:  
 a) Solvated  $\text{Na}^+$  ions      b) Solvated electrons      c) Solvated  $\text{NH}_2^-$  ions      d) Solvated protons
134. The chemical which is used for plastering the broken bones is  
 a)  $(\text{CaSO}_4)_2 \cdot \text{H}_2\text{O}$       b)  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$       c)  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$       d)  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
135. Magnesium burns in  $\text{CO}_2$  to form:  
 a) MgO and CO      b)  $\text{MgCO}_3$       c) MgO and C      d)  $\text{MgO}_2$
136. Which one is not a correct formula?  
 a)  $\text{H}_2\text{S}$       b)  $\text{NaHSO}_4$       c)  $\text{SiO}_2$       d)  $\text{NaSiO}_3$
137. Plaster of Paris on making paste with little water sets to hard mass due to formation of  
 a)  $\text{CaSO}_4$       b)  $\text{CaSO}_4 \cdot 1/2 \text{H}_2\text{O}$       c)  $\text{CaSO}_4 \cdot \text{H}_2\text{O}$       d)  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
138. The most reactive element among the following is:  
 a) Mg      b) Ca      c) Sr      d) Ba
139. Which removes temporary hardness of water and is used in the manufacture of bleaching powder?  
 a) Slaked lime  $\text{Ca}(\text{OH})_2$       b) Plaster of Paris      c) Epsom      d) hydrolith
140. A piece of magnesium ribbon was heated to redness in an atmosphere of  $\text{N}_2$  and then treated with  $\text{H}_2\text{O}$ , the gas evolved is:  
 a) Ammonia      b) Hydrogen      c) Nitrogen      d) Oxygen
141. Gypsum is:  
 a)  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$       b)  $\text{CaSO}_4 \cdot \text{H}_2\text{O}$       c)  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$       d)  $\text{CaSO}_4 \cdot 3\text{H}_2\text{O}$
142. Identify the correct statement:  
 a) Elemental sodium can be prepared and isolated by electrolysis of an aqueous solution of sodium chloride  
 b) Elemental sodium is a strong oxidising agent  
 c) Elemental sodium is insoluble in ammonia  
 d) Elemental sodium is easily oxidised
143. Water glass is:  
 a) Another name for sodium silicate  
 b) A special form of glass to store water only  
 c) Hydrated form of glass  
 d) Hydrated silica
144.  $\text{LiAlH}_4$  is obtained by reacting an excess of ....with an ethereal solution of  $\text{AlCl}_3$ :  
 a) LiCl      b) LiH      c) Li      d) LiOH
145. The correct order regarding the solubility of alkaline earth metal chlorides in water is:  
 a)  $\text{BeCl}_2 < \text{MgCl}_2 < \text{CaCl}_2 < \text{SrCl}_2 < \text{BaCl}_2$   
 b)  $\text{MgCl}_2 > \text{CaCl}_2 > \text{BeCl}_2 > \text{BaCl}_2 > \text{SrCl}_2$   
 c)  $\text{BaCl}_2 > \text{MgCl}_2 > \text{CaCl}_2 > \text{BeCl}_2 > \text{SrCl}_2$   
 d)  $\text{BeCl}_2 > \text{MgCl}_2 > \text{CaCl}_2 > \text{SrCl}_2 > \text{BaCl}_2$
146. The correct order of solubility of fluorides at alkaline earth metals is:  
 a)  $\text{MgF}_2 > \text{BaF}_2 > \text{SrF}_2 > \text{CaF}_2 > \text{BeF}_2$   
 b)  $\text{BeF}_2 > \text{MgF}_2 > \text{CaF}_2 > \text{SrF}_2 > \text{BaF}_2$   
 c)  $\text{BaF}_2 > \text{SrF}_2 > \text{CaF}_2 > \text{MgF}_2 > \text{BeF}_2$   
 d) None of the above
147. The ease of adsorption of the hydrates alkali metal ions on an ion-exchange resins follows the order:

- a)  $K^+ < Na^+ < Rb^+ < Li^+$   
 b)  $Na^+ < Li^+ < K^+ < Rb^+$   
 c)  $Li^+ < K^+ < Na^+ < Rb^+$   
 d)  $Rb^+ < K^+ < Na^+ < Li^+$
148. The hydration energy of  $Mg^{2+}$  ions is larger than that of:  
 a)  $Al^{3+}$                       b)  $Na^+$                       c)  $Be^{2+}$                       d)  $Mg^{3+}$
149. Chile saltpetre is the ore of:  
 a) Iodine                      b) Bromine                      c) Sodium                      d) Magnesium
150. Thomas slag is  
 a)  $Ca_3(PO_4)_2 \cdot 2H_2O$                       b)  $Ca_3(PO_4)_2 \cdot CaSiO_3$                       c)  $MgSiO_3$                       d)  $CaSiO_3$
151. Sodium carbonate is manufactured by Solvay process. The products those are recycled are:  
 a)  $CO_2$  and  $NH_3$                       b)  $CO_2$  and  $NH_4Cl$                       c)  $NaCl$  and  $CaO$                       d)  $CaCl_2$  and  $CaO$
152. Based on lattice energy and other considerations which one of the following alkali metal chlorides is expected to have the highest melting point?  
 a)  $RbCl$                       b)  $KCl$                       c)  $NaCl$                       d)  $LiCl$
153. Sodium carbonate on heating gives:  
 a) Water vapours  
 b) Carbon dioxide  
 c) Carbon dioxide + water vapour  
 d) None of the above
154. The correct order of hydration energy of alkaline earth metal ions is:  
 a)  $Be^{2+} > Mg^{2+} > Ca^{2+} > Sr^{2+} > Ba^{2+}$   
 b)  $Ba^{2+} > Be^{2+} > Ca^{2+} > Mg^{2+} > Sr^{2+}$   
 c)  $Mg^{2+} > Be^{2+} > Ba^{2+} > Ca^{2+} > Sr^{2+}$   
 d) None of the above
155. Which one has highest lattice energy?  
 a)  $NaBr$                       b)  $NaF$                       c)  $NaCl$                       d)  $NaI$
156. When  $CO_2$  is bubbled into an aqueous solution of  $Na_2CO_3$ , the following is formed:  
 a)  $H_2O$                       b)  $OH^-$                       c)  $NaHCO_3$                       d)  $NaOH$
157. The decomposition temperature is maximum for  
 a)  $SrCO_3$                       b)  $CaCO_3$                       c)  $MgCO_3$                       d)  $BaCO_3$
158. A metal carbonate is sparingly soluble in water and evolves  $CO_2$  on heating. The metal is:  
 a) An alkali metal  
 b) A noble metal  
 c) An alkaline earth metal  
 d) None of these
159. Anhydrous mixture of  $KF$  and  $HF$  contains which type of ions?  
 a)  $K^+, H^+, F^-$                       b)  $(KF)^+(HF)^-$                       c)  $KH^+, F^-$                       d)  $K^+(HF_2)^-$
160. Microcosmic salt is  
 a)  $Na_4P_2O_7$                       b)  $Na(NH_4)HPO_4$                       c)  $Na(NH_3)HPO_4 \cdot 4H_2O$                       d)  $MgNH_4PO_4$
161. Sodium burns in dry air to give:  
 a)  $Na_2O$                       b)  $Na_2O_2$                       c)  $NaO_2$                       d)  $Na_3N$
162. The byproduct of Solvay process is:  
 a)  $CO_2$                       b)  $CaCl_2$                       c)  $NH_3$                       d)  $CaCO_3$
163. Select the incorrect statement  
 a)  $Be$  can form complexes due to its very small size  
 b)  $Mg$  cannot form complexes  
 c)  $Mg$  burns in air releasing dazzling light rich in UV rays  
 d)  $CaCl_2 \cdot 6H_2O$  when mixed with ice gives freezing mixture
164. Acidified solution of sodium thiosulphate is unstable because in thiosulphate:

- a) The sulphur atoms are at unstable oxidation state of +2  
 b) The two sulphur atoms are in different oxidation states of +5 and -1  
 c) The S—S bond are unstable bonds  
 d) Thio compounds contain sulphur in zero oxidation state
165. From which mineral Ra is obtained?  
 a) Limestone                      b) Rutile                              c) Pitch blende                      d) Haematite
166. Metals belonging to the same group in the periodic table are:  
 a) Magnesium and sodium  
 b) Magnesium and copper  
 c) Magnesium and barium  
 d) Magnesium and potassium
167. In the extraction of sodium by Down's process, cathode and anode are respectively  
 a) Copper and nickel    b) Copper and chromium  
 c) Nickel and chromium    d) Iron and graphite
168. Which of the following statements is false regarding saline hydrides?  
 a) In the molten state they conduct electricity  
 b) They dissolve in water giving off hydrogen  
 c) They are used as reducing agents  
 d) They are covalent in nature
169. Among the alkali metals caesium is the most reactive because  
 a) Its incomplete shell is nearest to the nucleus.  
 b) It has a single electrons in the valence shell.  
 c) It is the heaviest alkali metal.  
 d) The outermost electron is more loosely bound than the outermost electron of the other alkali metals.
170. Soda ash is chemically:  
 a)  $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$                       b) NaOH                              c)  $\text{NaHCO}_3$                               d)  $\text{Na}_2\text{CO}_3$  (anhydrous)
171. Which of the following ions, will have maximum hydration energy?  
 a)  $\text{Sr}^{2+}$                               b)  $\text{Ba}^{2+}$                               c)  $\text{Ca}^{2+}$                               d)  $\text{Mg}^{2+}$
172. Chlorophyll contains:  
 a) Na                                      b) K                                      c) Mg                                      d) Mn
173. Oxygen can be obtained by heating:  
 a)  $\text{Na}_2\text{O}$                               b)  $\text{Fe}_2\text{O}_3$                               c)  $\text{Fe}_3\text{O}_4$                               d)  $\text{BaO}_2$
174. Which of the following pairs of substances would give same gaseous product in reaction with water?  
 a) Na and  $\text{Na}_2\text{O}_2$                       b) Ca and  $\text{CaH}_2$                       c) Ca and CaO                      d) Ba and  $\text{BaO}_2$
175. Which of the following is not correct?  
 a) Iodine oxidises sodium thiosulphate to sodium tetrathionate.  
 b) Sodium thiosulphate is soluble in water.  
 c) Ozone is used to identify the presence of unsaturation in alkenes.  
 d) Sodium thiosulphate reacts with iodine to form sodium sulphate.
176. Which of the following is not an ore of magnesium?  
 a) Carnallite                              b) Dolomite                              c) Calamine                              d) Sea water
177. The chloride that can be extracted with ether:  
 a) NaCl                                      b) LiCl                                      c)  $\text{BaCl}_2$                                       d)  $\text{CaCl}_2$
178. Iceland spar is:  
 a)  $\text{CaSiO}_4$                               b)  $\text{CaCO}_3$                               c)  $\text{CaF}_2$                                       d)  $\text{NaAlF}_6$
179. Which will react with acid and alkalies both *i. e.*, (amphoteric)  
 a) MgO                                      b) CaO                                      c) BaO                                      d) BeO
180. Fire extinguishers contain  $\text{H}_2\text{SO}_4$  and:  
 a)  $\text{NaHCO}_3$  and  $\text{Na}_2\text{CO}_3$                       b)  $\text{NaHCO}_3$  solution                      c)  $\text{Na}_2\text{CO}_3$                               d)  $\text{CaCO}_3$
181. The raw materials in Solvay process are:

- a) NaOH, CaO and NH<sub>3</sub>  
 b) Na<sub>2</sub>CO<sub>3</sub>, CaCO<sub>3</sub> and NH<sub>3</sub>  
 c) Na<sub>2</sub>SO<sub>4</sub>, CaCO<sub>3</sub> and NH<sub>3</sub>  
 d) NaCl, NH<sub>3</sub>, CaCO<sub>3</sub>
182. One mole of magnesium nitride on the reaction with an excess of water gives  
 a) One mole of NH<sub>3</sub>      b) Two moles of NH<sub>3</sub>      c) One mole of HNO<sub>3</sub>      d) Two moles of HNO<sub>3</sub>
183. Slaked lime is:  
 a) CaCO<sub>3</sub>      b) CaO      c) Ca(OH)<sub>2</sub>      d) Ca(C<sub>2</sub>O<sub>4</sub>)
184. Sodium thiosulphate is prepared by  
 a) Boiling Na<sub>2</sub>SO<sub>3</sub> solution with S in alkaline medium  
 b) Reducing Na<sub>2</sub>SO<sub>4</sub> solution with H<sub>2</sub>S  
 c) Boiling Na<sub>2</sub>SO<sub>3</sub> solution with S in acidic medium  
 d) Neutralising H<sub>2</sub>S<sub>2</sub>O<sub>3</sub> solution with NaOH
185. H<sub>2</sub>O is dipolar whereas BeF<sub>2</sub> is not. It is because:  
 a) The electronegativity of F is greater than O  
 b) H<sub>2</sub>O involves H-bonding whereas BeF<sub>2</sub> is discrete molecule  
 c) H<sub>2</sub>O is linear and BeF<sub>2</sub> is angular  
 d) H<sub>2</sub>O is angular and BeF<sub>2</sub> is linear
186. Setting of plaster of Paris involves  
 a) Oxidation with atmospheric oxygen      b) Combination with atmospheric CO<sub>2</sub>  
 c) Dehydration      d) Hydration to yield another hydrate
187. The following compounds have been arranged in order of their increasing thermal stabilities. Identify the correct order.  
 K<sub>2</sub>CO<sub>3</sub> (I)      MgCO<sub>3</sub> (II)  
 CaCO<sub>3</sub> (III)      BeCO<sub>3</sub> (IV)  
 a) I < II < III < IV      b) IV < II < III < I      c) IV < II < I < III      d) II < IV < III < I
188. The only element which is radioactive among alkali metals is:  
 a) Cs      b) Fr      c) Rb      d) Li
189. The pair of compounds which cannot exist together in solution is:  
 a) NaHCO<sub>3</sub> and NaOH      b) Na<sub>2</sub>CO<sub>3</sub> and NaHCO<sub>3</sub>      c) Na<sub>2</sub>CO<sub>3</sub> and NaOH      d) NaHCO<sub>3</sub> and NaCl
190. Potassium is kept in  
 a) Alcohol      b) Kerosene      c) Liquid ammonia      d) Water
191. Which one of the alkali metals, forms only, the normal oxide, M<sub>2</sub>O on heating in air?  
 a) Li      b) Na      c) Rb      d) K
192. Common table salt becomes moist and does not pour easily in rainy season because:  
 a) It contains magnesium chloride  
 b) It contains magnesium carbonate  
 c) It melts slightly in rainy season  
 d) Sodium chloride is hygroscopic
193. The calcium salt used as manure is:  
 a) CaC<sub>2</sub>      b) CaCN<sub>2</sub>      c) CaCO<sub>3</sub>      d) CaSO<sub>4</sub>
194. The product obtained on fusion of BaSO<sub>4</sub> and Na<sub>2</sub>CO<sub>3</sub> is  
 a) BaCO<sub>3</sub>      b) BaO      c) Ba(OH)<sub>2</sub>      d) BaHSO<sub>4</sub>
195. Lithium iodide is:  
 a) Ionic      b) Covalent      c) Partially covalent      d) None of these
196. Mg burns in CO to produce  
 a) MgO + CO      b) MgO<sub>2</sub>      c) MgO + C      d) MgCO<sub>3</sub>
197. A mixture of Al(OH)<sub>3</sub> and Fe(OH)<sub>3</sub> can be separated easily by treating it with:  
 a) HCl      b) NH<sub>4</sub>OH      c) HNO<sub>3</sub>      d) NaOH
198. Gypsum on heating at 120-230°C gives:  
 a) Hemihydrate      b) Monohydrate      c) Dehydrates      d) Anhydrous salt

199. Sodium metal cannot be stored under:
- a) Benzene                      b) Kerosene                      c) Alcohol                      d) Toluene
200. Which ion has closed shell electronic configuration?
- a) Li                      b) Li<sup>+</sup>                      c) Li<sup>2+</sup>                      d) Li<sup>-</sup>
201. Which out of the following compounds is called photographer's fixer?
- a) Na<sub>2</sub>SO<sub>3</sub>                      b) Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> · 5H<sub>2</sub>O                      c) Na<sub>2</sub>SO<sub>4</sub>                      d) Na<sub>2</sub>S
202. BeF<sub>2</sub> is soluble in water whereas fluorides of other alkaline earth metals are insoluble because of:
- a) Ionic nature of BeF<sub>2</sub>  
 b) Covalent nature of BeF<sub>2</sub>  
 c) Greater hydration energy of Be<sup>2+</sup> ion as compared to its lattice energy  
 d) None of the above
203. Sodium thiosulphate, Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> · 5H<sub>2</sub>O is used in photography to:
- a) Reduce the silver bromide grains to metallic silver  
 b) Convert the metallic silver to silver salt  
 c) Remove undecomposed AgBr as soluble silver thiosulphate complex  
 d) Remove reduced silver
204. Hypo is used in:
- a) Iodimetric titrations      b) Iodometric titrations      c) Photography      d) All of these
205. Which of the following is an epsom salt?
- a) 2CaSO<sub>4</sub> · H<sub>2</sub>O                      b) MgSO<sub>4</sub> · 7H<sub>2</sub>O  
 c) MgSO<sub>4</sub> · 2H<sub>2</sub>O                      d) BaSO<sub>4</sub> · 2H<sub>2</sub>O
206. Magnesium form Mg<sup>2+</sup> and not Mg<sup>+</sup> because:
- a) Magnesium (II) carbonate is insoluble in water  
 b) Generally higher oxidation states are preferred by metals  
 c) Ionic radius of Mg(II) is smaller than of Mg (I)  
 d) Hydration energy of divalent magnesium ion is higher
207. Which on mixing with water gives a hissing sound and becomes very hard?
- a) Slaked lime  
 b) Quick lime  
 c) Limestone  
 d) Superphosphate of lime
208. Molecular formula of Glauber's salt is
- a) MgSO<sub>4</sub> · 7H<sub>2</sub>O      b) CuSO<sub>4</sub> · 5H<sub>2</sub>O      c) FeSO<sub>4</sub> · 7H<sub>2</sub>O      d) Na<sub>2</sub>SO<sub>4</sub> · 10H<sub>2</sub>O
209. Dead burnt is:
- a) CaSO<sub>4</sub>      b) Na<sub>2</sub>CO<sub>3</sub>      c) Anhydrous Na<sub>2</sub>SO<sub>4</sub>      d) Anhydrous CuSO<sub>4</sub>
210. Bleaching powder is obtained by interaction of Cl<sub>2</sub> and:
- a) dil. Ca(OH)<sub>2</sub>(aq)      b) dry CaO      c) conc. Ca(OH)<sub>2</sub>(aq)      d) Dry slaked lime
211. Baking soda is:
- a) NaHCO<sub>3</sub>      b) NaHCO<sub>3</sub> · 6H<sub>2</sub>O      c) Na<sub>2</sub>CO<sub>3</sub>      d) Na<sub>2</sub>CO<sub>3</sub> · 10H<sub>2</sub>O
212. Which statement is false for alkali metals?
- a) Lithium is the strongest reducing agent  
 b) Sodium is amphoteric in nature  
 c) Li<sup>+</sup> is exceptionally small  
 d) All alkali metals give blue solution in liquid ammonia
213. Most abundant salt of sodium in nature is:
- a) NaNO<sub>3</sub>      b) Na<sub>2</sub>SO<sub>4</sub>      c) NaOH      d) NaCl
214. Which alkaline earth metal forms peroxide on burning in air?
- a) Be      b) Ca      c) Sr      d) Ba
215. In the manufacture of sodium hydroxide, byproduct obtained is:
- a) O<sub>2</sub>      b) Cl<sub>2</sub>      c) Na<sub>2</sub>CO<sub>3</sub>      d) NaCl

216. Alkaline earth metal oxide having the co-ordination number four is:  
 a) BeO                                      b) MgO                                      c) SrO                                      d) CaO
217. What are the products formed when an aqueous solution of magnesium bicarbonate is boiled?  
 a) MgO, H<sub>2</sub>O, CO<sub>2</sub>                      b) Mg(HCO<sub>3</sub>)<sub>2</sub>, H<sub>2</sub>O                      c) Mg(OH)<sub>2</sub>, H<sub>2</sub>O                      d) Mg, CO<sub>2</sub>, H<sub>2</sub>O
218. A metal *M* forms water soluble *MSO<sub>4</sub>* and inert *MO*. *MO* in aqueous solution forms insoluble *M(OH)<sub>2</sub>* soluble in NaOH. Metal *M* is  
 a) Be                                      b) Mg                                      c) Ca                                      d) Si
219. Alkali metals are characterised by:  
 a) Good conductors of heat and electricity  
 b) High melting points  
 c) Low oxidation potentials  
 d) High ionisation potentials
220. Sodium thiosulphate is used in photography  
 a) As AgBr grain is reduced to non-metallic silver                      b) To convert metallic silver into silver salt  
 c) To remove reduced silver                      d) To remove undecomposed AgBr in the form of Na<sub>3</sub>[Ag(S<sub>2</sub>O<sub>3</sub>)<sub>2</sub>] (a complex salt)
221. In which of the following, sodium carbonate is not used?  
 a) In soap making                      b) In paper making                      c) In tyre making                      d) In baking of bread
222. Alkaline earth metals are not found free in nature because of their:  
 a) Low melting point  
 b) High boiling point  
 c) Thermal instability  
 d) Great chemical activity
223. The principal products obtained on heating iodine with concentrated caustic soda solution are:  
 a) NaOI + NaI                      b) NaIO<sub>3</sub> + NaI                      c) NaOI + NaIO<sub>3</sub> + NaI                      d) NaIO<sub>4</sub> + NaI
224. NaOCl is used as a bleaching agent and sterilising agent. It can be synthesised by the action of  
 a) NaCl with H<sub>2</sub>O                      b) NH<sub>4</sub>Cl with NaOH  
 c) Cl<sub>2</sub> with cold and dilute NaOH                      d) Cl<sub>2</sub> with hot and concentrated NaOH
225. The compound insoluble in acetic acid is:  
 a) Calcium oxide                      b) Calcium carbonate                      c) Calcium hydroxide                      d) Calcium oxalate
226. Sodium carbonate contains:  
 a) 5 molecules of crystalline water  
 b) 10 molecules of crystalline water  
 c) 3 molecules of crystalline water  
 d) No molecule of crystalline water
227. Sodium carbonate reacts with SO<sub>2</sub> in aqueous solution to give:  
 a) NaHCO<sub>3</sub>                      b) NaHSO<sub>3</sub>                      c) Na<sub>2</sub>SO<sub>3</sub>                      d) NaHSO<sub>4</sub>
228. A sudden large jump between the values of second and third ionization energies of an element would be associated with the electronic configuration:  
 a) 1s<sup>2</sup>, 2s<sup>2</sup>2p<sup>6</sup>, 3s<sup>1</sup>                      b) 1s<sup>2</sup>, 2s<sup>2</sup>2p<sup>6</sup>, 3s<sup>2</sup>3p<sup>1</sup>                      c) 1s<sup>2</sup>, 2s<sup>2</sup>2p<sup>6</sup>, 3s<sup>2</sup>3p<sup>2</sup>                      d) 1s<sup>2</sup>, 2s<sup>2</sup>2p<sup>6</sup>, 3s<sup>2</sup>
229. Which of the following reacts with water with high rate?  
 a) Li                                      b) Rb                                      c) Na                                      d) K
230. The substance used as pigment in paint is  
 a) Borax                                      b) Alumina                                      c) Lithopone                                      d) None of these
231. Acidic solution of S<sub>2</sub>O<sub>3</sub><sup>2-</sup> is converted to ..... in presence of I<sub>2</sub>  
 a) S<sub>4</sub>O<sub>6</sub><sup>2-</sup> + I<sup>-</sup>                      b) SO<sub>4</sub><sup>2-</sup> + I<sup>-</sup>                      c) SO<sub>3</sub> + I<sup>-</sup>                      d) S<sub>4</sub>O<sub>6</sub><sup>2-</sup> + I<sub>3</sub><sup>-</sup>
232. Soda lime is  
 a) NaOH                                      b) NaOH and CaO                      c) CaO                                      d) Na<sub>2</sub>CO<sub>3</sub>
233. Lithopone is a mixture of:  
 a) Barium sulphate and zinc sulphide

- b) Barium sulphide and zinc sulphide  
 c) Calcium sulphate and zinc sulphide  
 d) Calcium sulphide and zinc sulphide
234. Alkali metal chloride soluble in pyridine is:  
 a) LiCl                                      b) CsCl                                      c) NaCl                                      d) KCl
235. The characteristic colours given by calcium, strontium and barium in the flame test are respectively  
 a) Brick red, apple green, crimson                                      b) Crimson, apple green, brick red  
 c) Crimson, brick red, apple green                                      d) Brick red, crimson, apple green
236. Sodium thiosulphate is formed when:  
 a) NaOH is neutralised by  $\text{H}_2\text{SO}_4$   
 b)  $\text{Na}_2\text{S}$  is boiled with S  
 c)  $\text{Na}_2\text{SO}_3$  is boiled with  $\text{Na}_2\text{S}$  and  $\text{I}_2$   
 d)  $\text{Na}_2\text{SO}_4$  is boiled with  $\text{Na}_2\text{S}$
237. In the following reaction,  
 $\text{NaOH} + \text{S} \rightarrow \text{A} + \text{Na}_2\text{S} + \text{H}_2\text{O}$  ; A is  
 a)  $\text{Na}_2\text{SO}_4$                                       b)  $\text{Na}_2\text{SO}_3$                                       c)  $\text{Na}_2\text{S}$                                       d)  $\text{Na}_2\text{S}_2\text{O}_3$
238. Sodium peroxide which is a yellow solid, when exposed to air becomes white due to the formation of  
 a)  $\text{H}_2\text{O}_2$                                       b)  $\text{Na}_2\text{O}$                                       c)  $\text{Na}_2\text{O}$  and  $\text{O}_3$                                       d) NaOH and  $\text{Na}_2\text{CO}_3$
239. Sedimentary rocks laid down under water mainly contain:  
 a) CaO                                      b)  $\text{Ca}(\text{OH})_2$                                       c)  $\text{CaCO}_3$                                       d)  $\text{CaSO}_4$
240. Potash alum is used in purification of water because:  
 a) It kills the micro-organisms  
 b) It precipitates the colloidal matter  
 c) It removes the hardness of water  
 d) It catalyses the removal of impurities
241. The main constituent of bones is:  
 a)  $\text{CaCO}_3$                                       b)  $\text{CaF}_2$                                       c)  $\text{CaSO}_4$                                       d)  $\text{Ca}_3(\text{PO}_4)_2$
242. Mortar is a mixture of:  
 a)  $\text{CaCO}_3$  and CaO  
 b) Slaked lime and water  
 c) Slaked lime, sand and water  
 d) None of the above
243. Sodium cannot be extracted by the electrolysis of brine solution because:  
 a) Sodium liberated reacts with water to produce  $\text{NaOH} + \text{H}_2$   
 b) Sodium being more electropositive than hydrogen,  $\text{H}_2$  is liberated at cathode and not sodium  
 c) Electrolysis cannot take place with brine solution  
 d) None of the above
244. The function of sand in mortar is:  
 a) To decrease the hardness  
 b) To make the mass compact  
 c) To decrease the plasticity of the mass  
 d) To prevent the excess shrinkage because of which cracks may result
245. The most homogeneous family in periodic table is of:  
 a) Alkali metals                                      b) Alkaline earth metals                                      c) Volatile metals                                      d) Coinage metals
246. Pick out the statement (s) which is (are) not true about the diagonal relationship of Li and Mg.  
 (i) Polarising powers of  $\text{Li}^+$  and  $\text{Mg}^{2+}$  are almost same.  
 (ii) Like Li, Mg decomposes water very fast.  
 (iii) LiCl and  $\text{MgCl}_2$  are deliquescent.  
 (iv) Like Li, Mg does not form solid bicarbonates.  
 a) (i) and (ii)                                      b) (ii) and (iii)                                      c) Only (ii)                                      d) Only (i)

247. Which is most basic in character?  
 a) NaOH                              b) KOH                              c) RbOH                              d) LiOH
248. On strong heating sodium bicarbonate changes into  
 a) Sodium monoxide              b) Sodium hydroxide              c) Sodium carbonate              d) Sodium peroxide
249. Fusion mixture is comprised of:  
 a)  $K_2CO_3 + Na_2CO_3$               b)  $KHSO_4 + NaHSO_4$               c)  $K_2CO_3 + NaHSO_4$               d)  $KHSO_4 + Na_2SO_3$
250. Which of the following will liberate hydrogen by its reaction with hydrochloric acid?  
 a) Copper                              b) Phosphorus                              c) Mercury                              d) Magnesium
251. Baking powder contains  
 a)  $NaHCO_3$ ,  $Ca(H_2PO_2)_2$  and starch                              b)  $NaHCO_3$ ,  $Ca(H_2PO_2)_2$   
 c)  $NaHCO_3$ , and starch                              d)  $NaHCO_3$
252. In the hardening stage of plaster of Paris, the compound formed is  
 a)  $CaSO_4$                               b) Orthorhombic  $CaSO_4 \cdot 2H_2O$   
 c)  $CaSO_4 \cdot H_2O$                               d) Monoclinic  $CaSO_4 \cdot 2H_2O$
253. Magnesium has polarising power closer to that of:  
 a) Li                              b) Na                              c) K                              d) Cs
254. Calcium does not combine directly with:  
 a)  $O_2$                               b)  $N_2$                               c)  $H_2$                               d) Carbon
255. A fire of lithium, sodium and potassium can be extinguished by  
 a)  $H_2O$                               b) Nitrogen                              c)  $CO_2$                               d) Asbestose blanket
256. Halides of alkaline earth metals form hydrates such as  $MgCl_2 \cdot 6H_2O$ ,  $CaCl_2 \cdot 6H_2O$ ,  $BaCl_2 \cdot 2H_2O$  and  $SrCl_2 \cdot 2H_2O$ . This shows that halides of group 2 elements:  
 a) Are hygroscopic in nature  
 b) Act as dehydrating agent  
 c) Can absorb moisture from air  
 d) All of the above
257. The process associated with sodium carbonate manufacture is known as ....process.  
 a) Chamber                              b) Haber                              c) Leblanc                              d) Castner
258. Thomas slag is  
 a)  $CaSiO_3$                               b)  $Ca_3(PO_4)_2$                               c)  $MnSiO_3$                               d)  $CaCO_3$
259. The formula of Norwegian saltpetre is:  
 a)  $NaNO_3$                               b)  $KNO_3$                               c)  $Ca(NO_3)_2 \cdot CaO$                               d)  $Ba(NO_3)_2$
260. Calcium is extracted by the electrolysis of:  
 a) Fused mixture of  $CaCl_2$  and  $CaF_2$   
 b)  $CaCl_2$  solution  
 c) Fused mixture of  $CaCl_2$  and  $NaF$   
 d)  $Ca_3(PO_4)_2$  solution
261. If NaOH is added to an aqueous solution of  $Zn^{2+}$  ions, a white precipitate appears and on adding excess NaOH, the precipitate dissolves. In this solution zinc exists in the:  
 a) Cationic part                              b) Anionic part                              c) Both in cationic and anionic parts                              d) There is no zinc left in the solution
262. Out of following which compound is used for preservation of wood?  
 a) NaCl                              b)  $HgCl_2$                               c)  $ZnCl_2$                               d)  $CaCl_2$
263.  $Ba(OH)_2$  is used to estimate the amount of:  
 a)  $N_2$                               b)  $CO_2$                               c) CO                              d)  $N_2O$
264. In certain matters, lithium differs from other alkali metals, the main reason for this is:  
 a) Small size of lithium atom and  $Li^+$  ion  
 b) Extremely high electropositivity of Li  
 c) Greater hardness of Li  
 d) Hydration of  $Li^+$  ion



265. An ore of potassium is:  
 a) Carnallite                      b) Cryolite                      c) Bauxite                      d) Dolomite
266. Order of increasing density is  
 a)  $Li < K < Na < Rb < Cs$                       b)  $Li < Na < K < Rb < Cs$   
 c)  $Cs < Rb < K < Na < Li$                       d)  $K < Li < Na < Rb < Cs$
267. The highly efficient method of obtaining beryllium is:  
 a) Reduction of beryllium halide with Mg  
 b) Reduction of beryllium oxide with carbon  
 c) Electrolysis of fused beryllium chloride  
 d) Dissociation of beryllium carbide
268. In curing cement plasters water is sprinkled from time to time. This helps in  
 a) Keeping it cool  
 b) Developing interlocking needle-like crystals of hydrated silicates  
 c) Hydrating sand and gravel mixed with cement  
 d) Converting sand into silicic acid
269. Which decomposes on heating?  
 a) NaOH                      b) KOH                      c) LiOH                      d) CaOH
270. The solubility of silver bromide in hypo solution due to the formation of  
 a)  $[Ag(S_2O_3)_2]^{3-}$                       b)  $Ag_2SO_3$                       c)  $[Ag(S_2O_3)]^-$                       d)  $Ag_2S_2O_3$
271. Which element of IA group is most abundantly found in combined state?  
 a) Li                      b) Na                      c) Cs                      d) K
272. Alkaline earth metal compounds are less soluble in water than corresponding alkali metal compounds because former have:  
 a) Lower lattice energy  
 b) Higher I.P.  
 c) Higher covalent character  
 d) Lower covalent character
273. Fluorspar is:  
 a)  $CaF_2$                       b) CaO                      c)  $H_2F_2$                       d)  $CaCO_3$
274. The most soluble compound in water is:  
 a) CuS                      b) MnS                      c)  $K_2S$                       d) ZnS
275. Calcium is obtained by  
 a) Electrolysis of molten  $CaCl_2$                       b) Roasting of lime stone  
 c) Reduction of  $CaCl_2$  with carbon                      d) Electrolysis of a solution of  $CaCl_2$  in water
276. The main reason for using a mercury electrolytic cell in NaOH manufacture is that:  
 a) Hg is toxic  
 b)  $Na^+$  is discharged at cathode  
 c) Hg has a high vapour pressure  
 d) Hg is a good conductor of electricity
277. The ionic mobility of alkali metal ions in aqueous solution is maximum for  
 a)  $K^+$                       b)  $Rb^+$                       c)  $Li^+$                       d)  $Na^+$
278. The products of the electrolysis of concentrated aqueous solution of common salt are:  
 a)  $Na + Cl_2$                       b)  $H_2 + O_2$                       c)  $NaOH + H_2 + Cl_2$                       d)  $NaOH + Cl_2 + O_2$
279. In the Down's cell KCl is added in NaCl to:  
 a) Lower its m.p.  
 b) Dissolve more of NaCl  
 c) Increase conductivity  
 d) Increase the dissociation
280.  $Na_2CO_3 + Fe_2O_3 \rightarrow A + CO_2$ ; A is:  
 a) NaFeO<sub>2</sub>                      b) Na<sub>3</sub>FeO<sub>3</sub>                      c) Fe<sub>3</sub>O<sub>4</sub>                      d) Na<sub>2</sub>FeO<sub>2</sub>

281. Blanc fixe used in paints is:  
 a) Finely divided  $\text{BaSO}_4$   
 b) Paste of  $\text{Ba(OH)}_2$   
 c) Suspension of  $\text{Ca(OH)}_2$   
 d)  $\text{MgCl}_2 \cdot 5\text{MgO} \cdot 5\text{H}_2\text{O}$
282. Calcium cyanide reacts with steam to form ammonia and:  
 a)  $\text{CaO}$                                       b)  $\text{Ca(HCO}_3)_2$                                       c)  $\text{CaCO}_3$                                       d)  $\text{Ca(OH)}_2$
283. Which salt on heating does not give brown coloured gas is?  
 a)  $\text{LiNO}_3$                                       b)  $\text{KNO}_3$                                       c)  $\text{Pb(NO}_3)_2$                                       d)  $\text{AgNO}_3$
284. The biggest ion is:  
 a)  $\text{Al}^{3+}$                                       b)  $\text{Ba}^{2+}$                                       c)  $\text{Na}^+$                                       d)  $\text{Mg}^{2+}$
285. The primary standard solution for estimation of  $\text{Na}_2\text{S}_2\text{O}_3$  is  
 a)  $\text{I}_2$  solution                                      b)  $\text{KMnO}_4$                                       c)  $\text{K}_2\text{Cr}_2\text{O}_7$                                       d) Oxalic acid
286. Which on heating with  $\text{NaOH}$  solution gives inflammable gas?  
 a)  $\text{S}$                                       b)  $\text{Zn}$                                       c)  $\text{NH}_4\text{Cl}$                                       d)  $\text{I}_2$
287. Hypo is chemically:  
 a)  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$                                       b)  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$                                       c)  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 4\text{H}_2\text{O}$                                       d)  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$
288. Which alkaline earth metal is the most abundant in the earth's crust?  
 a)  $\text{Mg}$                                       b)  $\text{Ca}$                                       c)  $\text{Sr}$                                       d)  $\text{Ba}$
289. A compound  $X$  on heating gives a colourless gas. This residue is dissolved in water to obtain  $Y$ . Excess  $\text{CO}_2$  is bubbled through aqueous solution of  $Y$  when  $Z$  is formed.  $Z$  on gentle heating gives back  $X$ . The  $X$  is  
 a)  $\text{CaCO}_3$                                       b)  $\text{Ca(HCO}_3)_2$                                       c)  $\text{Na}_2\text{CO}_3$                                       d)  $\text{NaHCO}_3$
290. The formula of the product formed, when sodium thiosulphate solution is added to silver bromide is  
 a)  $\text{Ag}_2\text{S}_2\text{O}_3$                                       b)  $\text{Ag}_2\text{S}$                                       c)  $\text{Na}_3[\text{Ag(S}_2\text{O}_3)_2]$                                       d)  $\text{Ag}_3[\text{Na(S}_2\text{O}_3)_2]$
291. Concrete is a mixture of:  
 a) Cement, lime and water  
 b) Cement, sand and water  
 c) Cement, sand, gravel and water  
 d) Cement, slaked lime and water
292. The reaction of water with sodium and potassium is:  
 a) Reversible  
 b) Irreversible and endothermic  
 c) Exothermic  
 d) Endothermic
293. Which one is the highest melting point halide?  
 a)  $\text{NaCl}$                                       b)  $\text{NaBr}$                                       c)  $\text{NaF}$                                       d)  $\text{NaI}$
294. Beryllium shows diagonal relationship with  
 a)  $\text{Mg}$                                       b)  $\text{Na}$                                       c)  $\text{B}$                                       d)  $\text{Al}$
295. Which metal dissolves in  $\text{NaOH}$  with the evolution of  $\text{H}_2$ ?  
 a)  $\text{Be}$                                       b)  $\text{Ca}$                                       c)  $\text{Mg}$                                       d)  $\text{Sr}$
296. Which one of the following order of stability is correct?  
 a)  $\text{MgCO}_3 > \text{CaCO}_3 > \text{SrCO}_3 > \text{BaCO}_3$                                       b)  $\text{BaCO}_3 > \text{SrCO}_3 > \text{CaCO}_3 > \text{MgCO}_3$   
 c)  $\text{MgCO}_3 > \text{BaCO}_3 > \text{SrCO}_3 > \text{CaCO}_3$                                       d)  $\text{CaCO}_3 > \text{BaCO}_3 > \text{MgCO}_3 > \text{SrCO}_3$
297. Baryta water is:  
 a)  $\text{BaO}$                                       b)  $\text{Ca(OH)}_2$                                       c)  $\text{Ba(OH)}_2$                                       d)  $\text{BaSO}_4$
298. Which reagent would enable you to remove  $\text{SO}_4^{2-}$  ions from solution containing both  $\text{SO}_4^{2-}$  and  $\text{Cl}^-$  ions?  
 a)  $\text{NaOH}$                                       b)  $\text{Pb}^{2+}$                                       c)  $\text{Ba(OH)}_2$                                       d)  $\text{BaSO}_4$
299. In India, at the occasion of marriages, the fireworks used give green flame. Which one of the following radicals may be present?

- a) Na                                      b) K                                      c) Ba                                      d) Ca
300. A substance which gives a brick red flame and breaks down on heating giving oxygen and a brown gas is:  
 a) Calcium carbonate  
 b) Magnesium nitrate  
 c) Magnesium carbonate  
 d) Calcium nitrate
301. When chlorine is passed through concentrated solution of KOH, the compound formed is:  
 a) KClO                                      b) KClO<sub>2</sub>                                      c) KClO<sub>3</sub>                                      d) KClO<sub>4</sub>
302. Which of the following does not illustrate the anomalous properties of lithium?  
 a) Li is much softer than the other group first metals  
 b) The m.p. and b.p. of Li are comparatively high  
 c) Li forms a nitride Li<sub>3</sub>N unlike group first metals  
 d) The ion of Li and its compounds are more heavily hydrated than those of the rest of the group elements
303. A white solid reacts with dil. HCl to give colourless gas that decolourises aqueous bromine. The solid is most likely to be:  
 a) Sodium carbonate                      b) Sodium chloride                      c) Sodium acetate                      d) Sodium thiosulphate
304. Out of the following metals that cannot be obtained by electrolysis of the aqueous solution of its salts is  
 a) Ag                                      b) Cr                                      c) Cu                                      d) Mg
305. The correct increasing covalent character is:  
 a) NaCl < LiCl < BeCl<sub>2</sub>      b) BeCl<sub>2</sub> < NaCl < LiCl      c) BeCl<sub>2</sub> < LiCl < NaCl      d) LiCl < NaCl < BeCl<sub>2</sub>
306. Portland cement has ....in its composition:  
 a) Maximum amount of SiO<sub>2</sub>  
 b) Minimum amount of Al<sub>2</sub>O<sub>3</sub>  
 c) Minimum amount of Fe<sub>2</sub>O<sub>3</sub>  
 d) Maximum amount of CaO
307. The reaction of sodium with water is highly exothermic. The rate of reaction is lowered by:  
 a) Lowering the temperature  
 b) Mixing with alcohol  
 c) Mixing with acetic acid  
 d) Making an amalgam
308. Which of the following carbonates decomposes at lowest temperature?  
 a) MgCO<sub>3</sub>                                      b) CaCO<sub>3</sub>                                      c) SrCO<sub>3</sub>                                      d) BaCO<sub>3</sub>
309. CaC<sub>2</sub> + N<sub>2</sub> → A, product A is  
 a) CaCN<sub>2</sub>                                      b) CaCN<sub>2</sub> and C                                      c) CaCN<sub>2</sub> + N<sub>2</sub>                                      d) None of these
310. The metal present in Grignard reagent is:  
 a) Ca                                      b) Mg                                      c) Zn                                      d) Fe
311. The characteristic not related to alkali metal is  
 a) High ionisation energy                      b) Their ions are isoelectronic with noble gases  
 c) Low melting point                      d) Low electronegativity
312. A colourless salt gives violet colour to Bunsen flame and also turns moisture litmus paper blue. It is:  
 a) Na<sub>2</sub>CO<sub>3</sub>                                      b) KNO<sub>3</sub>                                      c) K<sub>2</sub>CO<sub>3</sub>                                      d) Cu(OH)<sub>2</sub>
313. Which possesses highest lattice energy?  
 a) NaCl                                      b) LiF                                      c) CsI                                      d) KF
314. Which of the following has the largest size in aqueous solution?  
 a) Rb<sup>+</sup>                                      b) Na<sup>+</sup>                                      c) K<sup>+</sup>                                      d) Li<sup>+</sup>
315. On prolonged exposure to air, sodium finally changes to:  
 a) Na<sub>2</sub>CO<sub>3</sub>                                      b) Na<sub>2</sub>O                                      c) NaOH                                      d) NaHCO<sub>3</sub>
316. The compound which is insoluble in hot water and NH<sub>3</sub> is:  
 a) PbCl<sub>2</sub>                                      b) AgCl                                      c) BaSO<sub>4</sub>                                      d) None of these
317. Which of the following statements are correct for alkali metal compounds?  
 (i) Superoxides are paramagnetic in nature.

- (ii) The basic strength of hydroxides increases down the group.  
 (iii) The conductivity of chlorides in their aqueous solutions decreases down the group.  
 (iv) The basic nature of carbonates in aqueous solutions is due to cationic hydrolysis.
- a) (i), (ii), and (iii) only  
 b) (i), and (ii), only  
 c) (ii), (iii) and (iv) only  
 d) (iii) and (iv) only
318. Flash bulbs contain wire or foil of Mg packed in an atmosphere of:  
 a)  $\text{SO}_3$                       b)  $\text{O}_2$                       c) Air                      d)  $\text{N}_2$
319. The main product obtained when a solution of sodium carbonate reacts with mercuric chloride is  
 a)  $\text{Hg}(\text{OH})_2$                       b)  $\text{HgCO}_3 \cdot \text{HgO}$                       c)  $\text{HgCO}_3$                       d)  $\text{HgCO}_3 \cdot \text{Hg}(\text{OH})_2$
320. Milk of magnesia is:  
 a)  $\text{Mg}(\text{OH})_2$                       b)  $\text{Ca}(\text{OH})_2$                       c)  $\text{Ba}(\text{OH})_2$                       d) None of these
321. What would you observe if excess of dilute NaOH solution is added and shaken with an aqueous solution of aluminium chloride?  
 a) A permanent white precipitate is formed immediately  
 b) No change at first but a white precipitate is formed on standing  
 c) A white precipitate is formed which later dissolves  
 d) A green precipitate which turns red on standing in air
322. Which property of  $\text{Na}_2\text{S}_2\text{O}_3$  makes it useful in photography?  
 a) Photochemical property                      b) Complex formation property  
 c) Oxidising agent                      d) Reducing agent
323. Ca on exposure in moist air forms a layer on surface of:  
 a)  $\text{CaCO}_3$                       b)  $\text{Ca}(\text{OH})_2$                       c)  $\text{CaCO}_3 \cdot \text{Ca}(\text{OH})_2$                       d) CaO
324. Which of the following is different from the other three?  
 a) MgO                      b) SnO                      c) ZnO                      d)  $\text{Cr}_2\text{O}_3$
325. Salt used as a purgative is:  
 a) NaCl                      b)  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$                       c)  $\text{Ca}_3\text{Al}_2\text{O}_6$                       d)  $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
326. Tin dissolves in boiling caustic soda solution because of the formation of soluble:  
 a)  $\text{Sn}(\text{OH})_2$                       b)  $\text{Sn}(\text{OH})_4$                       c)  $\text{Na}_2\text{SnO}_3$                       d) None of these
327. Alkali metals contain:  
 a) 7 valence electrons                      b) 1 valence electron                      c) 4 valence electrons                      d) 2 valence electrons
328. The wire of flash bulbs are made up of:  
 a) Mg                      b) Ba                      c) Cu                      d) Ag
329. Addition of excess of sodium hydroxide solution to a solution of nickel sulphate results in the formation of a:  
 a) Green precipitate                      b) Pink colouration                      c) Blue precipitate                      d) Violet colouration
330. Several blocks of Mg are fixed to the bottom of a ship to:  
 a) Prevent action of water and salt  
 b) Prevent puncturing by under sea rocks  
 c) Keep away the sharks  
 d) Make the ship lighter
331. An inorganic compound first melts then resolidifies and then liberates a gas. It may be:  
 a)  $\text{KClO}_3$                       b)  $\text{KMnO}_4$                       c)  $\text{Al}_2\text{O}_3$                       d)  $\text{MnO}_2$
332. Sodium sulphate is soluble in water whereas barium sulphate is sparingly soluble because:  
 a) The hydration energy of sodium sulphate is more than its lattice energy  
 b) The lattice energy has no role to play in solubility  
 c) The hydration energy of sodium sulphate is less than its lattice energy  
 d) None of the above
333. NaCl crystals possesses:  
 a) Simple cubic lattice

- b) Face centred cubic lattice  
 c) Body centred cubic lattice  
 d) Octahedral lattice
334. The carbonate that will not decompose on heating is  
 a)  $\text{Na}_2\text{CO}_3$                       b)  $\text{CaCO}_3$                       c)  $\text{BaCO}_3$                       d)  $\text{SrCO}_3$
335. The  $\text{Ca}^{2+}$  ion has the same number of electrons as:  
 a)  $\text{Mg}^{2+}$                       b)  $\text{C}_2\text{H}_6$                       c)  $\text{Cu}^{2+}$                       d) Ne
336. When washing soda is heated  
 a)  $\text{CO}_2$  is released                      b)  $\text{CO} + \text{CO}_2$  is released  
 c)  $\text{CO}$  is released                      d) Water vapour is released
337. Which one of the following substances is used in the laboratory for a fast drying of neutral gases?  
 a) Phosphorus pentoxide                      b) Active charcoal  
 c) Anhydrous calcium chloride                      d)  $\text{Na}_3\text{PO}_4$
338. The active constituent of bleaching powder is:  
 a)  $\text{Ca}(\text{OCl})_2$                       b)  $\text{Ca}(\text{OCl})\text{Cl}$                       c)  $\text{Ca}(\text{ClO}_2)_2$                       d)  $\text{Ca}(\text{ClO}_2)\text{Cl}$
339. Sodium metabisulphite is not:  
 a) An antichlor                      b) A bleaching agent                      c) An oxidizing agent                      d) A reducing agent
340. Which of the following substances is used in the laboratory for fast drying of neutral gases?  
 a) Sodium sulphate                      b) Phosphorus pentoxide  
 c) Sodium phosphate                      d) Anhydrous calcium chloride
341. Sodium thiosulphate is a  
 a) Reducing agent                      b) Oxidising agent                      c) Complexing agent                      d) Bleaching agent
342. Alkaline earth metal salts are:  
 a) Paramagnetic                      b) Diamagnetic                      c) Ferromagnetic                      d) All of these
343. Molten  $\text{NaCl}$  conducts electricity due to the presence of:  
 a) Free molecules                      b) Free electrons                      c) Free ions                      d) Atoms
344. The oxide of which metal is most stable to heat?  
 a) K                      b) Ag                      c) Hg                      d) All of these
345. A solution of sodium thiosulphate on addition of few drops of ferric chloride gives violet colour due to the formation of  
 a)  $\text{Na}_2\text{S}_4\text{O}_6$                       b)  $\text{Fe}_2(\text{SO}_4)_3$                       c)  $\text{Fe}_2(\text{S}_2\text{O}_3)_3$                       d)  $\text{Fe}_2(\text{S}_2\text{O}_3)_2$
346. Excess of  $\text{Na}^+$  ions in human system causes:  
 a) Diabetes                      b) Anaemia                      c) Low blood pressure                      d) High blood pressure
347. Which has lowest thermal stability?  
 a)  $\text{Li}_2\text{CO}_3$                       b)  $\text{Na}_2\text{CO}_3$                       c)  $\text{K}_2\text{CO}_3$                       d)  $\text{Rb}_2\text{CO}_3$
348. When  $\text{NaCl}$  is dissolved in water, the sodium ions become:  
 a) Oxidized                      b) Reduced                      c) Hydrolysed                      d) Hydrated
349. The difference of water molecules in gypsum and plaster of Paris is  
 a)  $\frac{5}{2}$                       b) 2                      c)  $\frac{1}{2}$                       d)  $1\frac{1}{2}$
350. A radioactive element  $X$  decays giving two inert gases is:  
 a)  ${}^{238}_{92}\text{U}$                       b)  ${}^{226}_{88}\text{Ra}$                       c)  ${}^{239}_{90}\text{Th}$                       d)  ${}^{227}_{93}\text{Np}$
351. The chloride ion is isoelectronic with potassium. The size of chloride ion is:  
 a) Larger than  $\text{K}^+$  ion  
 b) Smaller than  $\text{K}^+$  ion  
 c) Same as that of  $\text{K}^+$  ion  
 d) None of these
352. Which of the alkali metal chloride is expected to have highest m.p.?  
 a)  $\text{LiCl}$                       b)  $\text{NaCl}$                       c)  $\text{KCl}$                       d)  $\text{RbCl}$
353. On heating sodium metal in a current of dry ammonia gas the compound formed is:  
 a) Sodium nitrate                      b) Sodium hydride                      c) Sodium amide                      d) Sodium azide

354. Most powerful reducing agent is  
 a) Li                                      b) Na                                      c) Ca                                      d) Mg
355. The ionic conductance is least for  
 a)  $\text{Cs}^+$                                       b)  $\text{Rb}^+$                                       c)  $\text{K}^+$                                       d)  $\text{Na}^+$
356. When carbon monoxide is passed over solid caustic soda heated to  $200^\circ\text{C}$ , it forms:  
 a)  $\text{Na}_2\text{CO}_3$                                       b)  $\text{NaHCO}_3$                                       c)  $\text{HCOONa}$                                       d) None of these
357.  $\text{MgBr}_2$  and  $\text{MgI}_2$  are soluble in acetone because of:  
 a) Their ionic nature  
 b) Their covalent nature  
 c) Their coordinate nature  
 d) None is correct
358. Beryl is:  
 a)  $\text{BaSO}_4$                                       b)  $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$                                       c)  $\text{BeO}$                                       d)  $\text{BaCO}_3$
359. The property of the alkaline earth metals that increases with their atomic number is  
 a) Solubility of their sulphates                                      b) Ionisation energy  
 c) Solubility of their hydroxides                                      d) Electronegativity
360. Sodium chloride is known as:  
 a) Rock salt                                      b) Common salt                                      c) Table salt                                      d) All of these
361. Bleaching powder is a compound having the molecular formula  
 a)  $\text{CaClO}$                                       b)  $\text{CaOCl}_3$                                       c)  $\text{CaOCl}_2$                                       d)  $\text{CaClO}_3$
362. An aqueous solution of salt of sodium ( $\text{NaX}$ ) on boiling with  $\text{MgCl}_2$  gives white precipitate, hence anion  $X$  is:  
 a)  $\text{HCO}_3^-$                                       b)  $\text{NO}_3^-$                                       c)  $\text{CO}_3^{2-}$                                       d)  $\text{SO}_4^{2-}$
363. Which of the following is not known?  
 a)  $\text{K}_2\text{O}$                                       b)  $\text{K}_2\text{O}_2$                                       c)  $\text{KO}_4$                                       d)  $\text{KO}_3$
364. The first ionization energies of alkaline earth metals are higher than those of the alkali metals. This is because:  
 a) There is increase in the nuclear charge of the alkaline earth metals  
 b) There is decrease in the nuclear charge of the alkaline earth metals  
 c) There is no change in the nuclear charge  
 d) None of the above
365.  $\text{NaOH}$  is prepared by the method:  
 a) Down's cell                                      b) Castner cell                                      c) Solvay process                                      d) Castner - Kellner cell
366. Commonly used laboratory desiccant is:  
 a) Calcium chloride                                      b) Sodium carbonate                                      c) Sodium chloride                                      d) Potassium nitrate
367. An aqueous solution of  $\text{KI}$  does not give a precipitate with:  
 a)  $\text{Mg}^{2+}$                                       b)  $\text{Pb}^{2+}$                                       c)  $\text{Hg}^{2+}$                                       d)  $\text{Cu}^{2+}$
368. Both  $\text{Be}$  and  $\text{Al}$  become passive on reaction with conc. Nitric acid due to:  
 a) The non-reactive nature of the metal  
 b) The non-reactive nature of the acid  
 c) The formation of an inert layer of oxide on the surface of the metals  
 d) None of the above
369. Which of the following metals is extracted by the electrometallurgical method?  
 a)  $\text{Fe}$                                       b)  $\text{Cu}$                                       c)  $\text{Ni}$                                       d)  $\text{Na}$
370. When  $\text{K}_2\text{O}$  is added to water, the solution is basic because it contains a significant concentration of:  
 a)  $\text{O}_2^{2-}$                                       b)  $\text{O}^{3-}$                                       c)  $\text{OH}^-$                                       d)  $\text{K}^+$
371. The metal, that is extracted from sea water is:  
 a)  $\text{Cl}$                                       b)  $\text{Ca}$                                       c)  $\text{Mg}$                                       d)  $\text{Br}$
372. A metal ' $M$ ' reacts with  $\text{N}_2$  to give a compound ' $A$ ' ( $M_3N$ ). ' $A$ ' on heating at high temperature gives back ' $M$ ' and ' $A$ ' on reacting with  $\text{H}_2\text{O}$  gives a gas  $B$ . ' $B$ ' turns  $\text{CuSO}_4$  solution blue on passing through it.

- M* and *B* can be
- a) Al and NH<sub>3</sub>                      b) Li and NH<sub>3</sub>                      c) Na and NH<sub>3</sub>                      d) Mg and NH<sub>3</sub>
373. The salts of which alkaline earth metal are used in the form of manure?  
a) Mg                      b) Ca                      c) Ba                      d) Sr
374. Mixture of MgCl<sub>2</sub> and MgO is called  
a) Portland cement                      b) Sorel's cement                      c) Double salt                      d) None of these
375. Which has maximum electropositive character?  
a) Mg                      b) Al                      c) P                      d) S
376. Which one of the following reactions occur at the anode, in the Castner process of extracting sodium metal?  
a)  $H_2 \rightarrow 2H^+ + 2e^-$                       b)  $2Cl^- \rightarrow Cl_2 + 2e^-$   
c)  $4OH^- \rightarrow 2H_2O + O_2 + 4e^-$                       d)  $Na^+ + e^- \rightarrow Na$
377. Calcium is obtained by  
a) Electrolysis of molten CaCl<sub>2</sub>                      b) Electrolysis of solution of CaCl<sub>2</sub> in water  
c) Reduction of CaCl<sub>2</sub> with carbon                      d) Roasting of lime stone
378. Mg keeps on burning in:  
a) N<sub>2</sub>                      b) CO<sub>2</sub>                      c) O<sub>2</sub>                      d) All of these
379. Baking soda or baking powder is:  
a) Washing soda                      b) Caustic soda                      c) Soda ash                      d) Sodium bicarbonate
380. The most basic oxide among the following is:  
a) Na<sub>2</sub>O                      b) BaO                      c) As<sub>2</sub>O<sub>3</sub>                      d) Al<sub>2</sub>O<sub>3</sub>
381. Bleaching powder is obtained by treating chlorine with  
a) CaCO<sub>3</sub>                      b) Ca(OH)<sub>2</sub>                      c) CaO                      d) None of these
382. Siedlitz powder contains:  
a) CaCO<sub>3</sub>                      b) MgCO<sub>3</sub>                      c) NaHCO<sub>3</sub>                      d) KNO<sub>3</sub>
383. Sodium bicarbonate is manufactured by:  
a) Cyanide process                      b) Thermite process                      c) Contact process                      d) Solvay process
384. Sodium reacts with water more vigorously than lithium because it:  
a) Has higher atomic weight  
b) Is more electronegative  
c) Is more electropositive  
d) Is a metal
385. Which one of the following on hydrolysis, gives the corresponding metallic hydroxide, H<sub>2</sub>O<sub>2</sub> and O<sub>2</sub>?  
a) Li<sub>2</sub>O                      b) Na<sub>2</sub>O<sub>2</sub>                      c) NaO<sub>2</sub>                      d) Na<sub>2</sub>O
386. The alkali metals:  
a) Form salt like hydrides  
b) Form salts which are predominantly covalent  
c) Show decreased chemical reactivity with dry oxygen in going from Li to Cs  
d) Show increasing electronegativity from Li to Cs
387. Alkali metals are soft and have relatively low m.p. and low density. This is because:  
a) Interatomic bonds are weak  
b) Interatomic bonds are strong  
c) Of their ionization potential  
d) Of their position in the periodic table
388. The starting material used in Solvay's process are  
a) Sodium sulphate                      b) Brine solution                      c) Carnallite                      d) All of these
389. In Down's method for the extraction of sodium, the melting point of the electrolyte is lowered by adding  
a) Potassium chloride                      b) Calcium chloride  
c) Both calcium chloride and potassium fluoride                      d) Potassium fluoride only
390. In the alkaline earth metals, the element forming predominantly covalent compound is  
a) Ca                      b) Sr                      c) Mg                      d) Be

391. Which is used to remove  $N_2$  from air?  
 a) Mg                                      b) P                                      c)  $H_2SO_4$                                       d)  $CaCl_2$
392. Elements of IIA group having electronic configuration  $ns^2$  are called alkaline earth elements because:  
 a) They only occur in earth  
 b) Their salts form only alkaline solution  
 c) They are form divalent cations only  
 d) Their oxides are non-fusible like earth matter
393. The right order of the solubility of sulphates of alkaline earth metals in water is  
 a)  $Be > Ca > Mg > Ba > Sr$                                       b)  $Mg > Be > Ba > Ca > Sr$   
 c)  $Be > Mg > Ca > Sr > Ba$                                       d)  $Mg > Ca > Ba > Be > Sr$
394. Lithium is the only alkali metal which is not placed in kerosene but is wrapped in paraffin wax, because:  
 a) It reacts with kerosene  
 b) It floats to the surface of kerosene because of low density  
 c) It does not react with air and  $H_2O$   
 d) None of the above
395. In which of the following processes, fused sodium hydroxide is electrolysed at  $330^\circ C$  temperature for extraction of sodium?  
 a) Castner's process                      b) Cyanide process                      c) Down's process                      d) Both (b) and (c)
396. When sulphur is heated with  $NaOH(aq)$  the compounds formed are:  
 a)  $Na_2S + H_2O$   
 b)  $Na_2SO_3 + H_2O$   
 c)  $Na_2S + Na_2S_2O_3 + H_2O$   
 d)  $Na_2S_2O_3 + H_2O$
397. Colemnite is  
 a)  $Ca[B_2O_4(OH)_2] \cdot 2H_2O$                                       b)  $Ca_2B_6O_{11} \cdot 5H_2O$   
 c)  $Ca(OH)_2$                                       d)  $Na_2B_4O_7 \cdot 2H_2O$
398. Ionic hydrides:  
 a) Conduct electricity in fused state  
 b) Are formed with elements of high ionization energy  
 c) Do not exist  
 d) Occupy the vacant spaces in metallic lattice
399. The chemical formula of plaster of Paris is  
 a)  $CaSO_4 \cdot \frac{1}{2}H_2O$                       b)  $CaSO_4 \cdot H_2O$                       c)  $CaSO_4 \cdot 2H_2O$                       d)  $CaSO_4 \cdot 3H_2O$
400. Alloys of which metal are light and strong and are used in the manufacture of aeroplane parts?  
 a) Cr                                      b) Sn                                      c) Fe                                      d) Mg
401. When magnesium is burnt in air, compounds of magnesium formed are magnesium oxide and:  
 a)  $MgCO_3$                                       b)  $Mg(NO_2)_2$                                       c)  $Mg(NO_3)_2$                                       d)  $Mg_3N_2$
402. The decreasing order of second ionization energy of K, Ca and Ba is:  
 a)  $Ca > Ba > K$                       b)  $Ba > K > Ca$                       c)  $K > Ca > Ba$                       d)  $K > Ba > Ca$
403. Setting of plaster of Paris is  
 a) Dehydration                                      b) Oxidation with atmospheric oxygen  
 c) Combination with atmospheric  $CO_2$                                       d) Hydration to yield another hydrate
404. Which of the following metals has stable carbonates?  
 a) Al                                      b) Si                                      c) Mg                                      d) Na
405. Beryllium hydride is obtained by:  
 a) Heating Be in atmosphere of  $H_2$   
 b) The action of  $BeCl_2$  with  $LiAlH_4$   
 c) The action of Be with  $CaH_2$   
 d) None of the above
406. When hydrated  $MgCl_2 \cdot 6H_2O$  is strongly heated:



- a) MgO is formed  
 b) Mg(OH)<sub>2</sub> is formed  
 c) Mg(OH)Cl is formed  
 d) Anhydrous MgCl<sub>2</sub> is formed
407. The weakest base among the following is:  
 a) NaOH                      b) Ca(OH)<sub>2</sub>                      c) KOH                      d) Ba(OH)<sub>2</sub>
408. The element which does not dissolve in caustic soda is:  
 a) Silicon                      b) Aluminium                      c) Zinc                      d) Cadmium
409. Magnesium can displace:  
 a) Cs                      b) Cu                      c) Rb                      d) K
410. The colour of iodine solution is discharged by shaking it with aqueous solution of:  
 a) H<sub>2</sub>SO<sub>4</sub>                      b) Sodium sulphide                      c) Sodium sulphate                      d) Sodium thiosulphate
411. Mg burns with a brilliant flame. This property is used in:  
 a) Fireworks  
 b) Military signals  
 c) Photographic flash bulbs  
 d) All of the above
412. The products obtained on heating LiNO<sub>3</sub> will be  
 a) LiNO<sub>2</sub> + O<sub>2</sub>                      b) Li<sub>2</sub>O + NO<sub>2</sub> + O<sub>2</sub>                      c) Li<sub>3</sub>N + O<sub>2</sub>                      d) Li<sub>2</sub>O + OH + O<sub>2</sub>
413. Bleaching action of bleaching powder is due to the liberation of  
 a) O<sub>2</sub>                      b) OCl<sup>-</sup>                      c) Cl<sub>2</sub>                      d) Cl<sup>-</sup>
414. Barium burns in air to form  
 a) Ba<sub>2</sub>O<sub>2</sub>                      b) BaO<sub>2</sub>                      c) Ba(OH)<sub>2</sub>                      d) BaO
415. The lightest metal among these is  
 a) Li                      b) Mg                      c) Ca                      d) Na
416. A gas reacts with CaO and not with NaHCO<sub>3</sub> is:  
 a) CO<sub>2</sub>                      b) Cl<sub>2</sub>                      c) O<sub>2</sub>                      d) N<sub>2</sub>
417. Which of the following hydroxides is insoluble in water?  
 a) Ba(OH)<sub>2</sub>                      b) Ca(OH)<sub>2</sub>                      c) Be(OH)<sub>2</sub>                      d) Mg(OH)<sub>2</sub>
418. Complex forming tendency is more for  
 a) Na<sup>+</sup>                      b) K<sup>+</sup>                      c) Li<sup>+</sup>                      d) Rb<sup>+</sup>
419. NO<sub>2</sub> is obtained by heating:  
 a) CsNO<sub>3</sub>                      b) KNO<sub>3</sub>                      c) LiNO<sub>3</sub>                      d) NaNO<sub>3</sub>
420. Alkali metals act as  
 a) Good dehydrating agent                      b) Good reducing agent  
 c) Good oxidising agent                      d) None of these
421. The mineral of magnesium is:  
 a) Bauxite                      b) Malachite                      c) Carnallite                      d) Haematite
422. Mortar is a mixture of  
 a) Cement, sand and water                      b) MgCl<sub>2</sub>, tar and lime  
 c) Lime, Portland cement and water                      d) None of the above
423. In between the metals A and B, both form oxide but B also forms nitride, when both burn in air. So A and B are:  
 a) Cs, K                      b) Mg, Ca                      c) Li, Na                      d) K, Mg
424. Calcium hydride on hydrolysis gives:  
 a) CaO + H<sub>2</sub>                      b) Ca(OH)<sub>2</sub> only                      c) Ca(OH)<sub>2</sub> + H<sub>2</sub>                      d) CaO only
425. Be(OH)<sub>2</sub> is insoluble in water, while Ba(OH)<sub>2</sub> is highly soluble due to  
 a) Lattice energy difference                      b) Common ion effect  
 c) Bond order                      d) Hard acid
426. The number and types of bonds between two carbon atoms in CaC<sub>2</sub> are:  
 a) One sigma, one pi                      b) One sigma, two pi                      c) Two sigma, one pi                      d) Two sigma, two pi

427. Which of the following alkaline earth metal sulphate has hydration enthalpy by higher than its lattice enthalpy:
- a)  $\text{CaSO}_4$                       b)  $\text{BeSO}_4$                       c)  $\text{BaSO}_4$                       d)  $\text{SrSO}_4$
428. NaOH is not used in:
- a) Soap                              b) Synthetic petrol                      c) Paper                              d) Synthetic fibre
429. Cement does not contain
- a) Calcium                              b) Aluminium                              c) Sulphur                              d) Iron
430. A solution of KOH in water is called:
- a) Potash lye                              b) Soda lye                              c) Salt cake                              d) None of these
431. Sodium has.....as compared to potassium:
- a) Less electronegativity  
b) More ionization enthalpy  
c) Large atomic radius  
d) Lower melting point
432. Sodium peroxide in contact with moist air turns white due to the formation of:
- a)  $\text{Na}_2\text{O}$                               b)  $\text{Na}_2\text{CO}_3$                               c)  $\text{NaHCO}_3$                               d) NaOH
433. When  $\text{SiCl}_4$  vapours are passed over hot Mg, the products formed are:
- a)  $\text{SiCl}_2 + \text{MgCl}_2$                               b)  $\text{Mg}_2\text{Si} + \text{Cl}_2$                               c)  $\text{Si} + \text{MgCl}_2$                               d)  $\text{MgSiCl}_6$
434. Which alkaline earth metal nitride is volatile?
- a)  $\text{Be}_3\text{N}_2$                               b)  $\text{Mg}_3\text{N}_2$                               c)  $\text{Ca}_3\text{N}_2$                               d) None of these
435. Which alkali metal bicarbonates does not exist as solid?
- a)  $\text{LiHCO}_3$                               b)  $\text{KHCO}_3$                               c)  $\text{CsHCO}_3$                               d)  $\text{NaHCO}_3$
436.  $\text{Na}_2\text{SO}_3$  and  $\text{NaHCO}_3$  may be distinguished by treating their aqueous solution with:
- a) Litmus solution                              b) Dil. Acid                              c) MgO                              d)  $\text{MgSO}_4$
437. The cation which forms a yellow precipitate with potassium chromate in acetic acid is:
- a)  $\text{NH}_4^+$                               b)  $\text{Ba}^{2+}$                               c)  $\text{Ca}^{2+}$                               d)  $\text{Na}^+$
438. The alkali metal which acts as a nutrient for plants is:
- a) Na                              b) K                              c) Li                              d) Rb
439. Glauber's salt is
- a)  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$                               b)  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$                               c)  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$                               d)  $\text{CaSO}_4 \cdot 5\text{H}_2\text{O}$
440. Excess of dilute sodium hydroxide solution is gradually added with shaking to an aqueous solution of zinc sulphate. What would you observe?
- a) A light blue precipitate is first formed which finally dissolves to give a deep blue solution  
b) A white precipitate appears which dissolves to give a colourless solution  
c) A white precipitate is formed which does not dissolve  
d) No change takes place and the solution remains clear
441. Which of the following metals is most reactive towards water?
- a) Na                              b) K                              c) Rb                              d) Cs
442. Some large white transparent crystals are left out in a bowl for several days. They are then observed to have changed their form into white powder. The crystals may have been of:
- a) Ammonium chloride                              b) Sodium chloride                              c) Sodium carbonate                              d) Calcium oxide
443. Which of the following is not soluble in NaOH?
- a)  $\text{Fe}(\text{OH})_3$                               b)  $\text{Zn}(\text{OH})_2$                               c)  $\text{Al}(\text{OH})_3$                               d)  $\text{Sn}(\text{OH})_2$
444. Which of the following metal carbonates is decomposed on heating?
- a)  $\text{Na}_2\text{CO}_3$                               b)  $\text{MgCO}_3$                               c)  $\text{K}_2\text{CO}_3$                               d)  $\text{Rb}_2\text{CO}_3$
445. The dark red colour of bombs in fireworks is due to the presence of
- a) Na                              b) Sr                              c) Ba                              d) K
446. Which metal does not form ionic hydride?
- a) Na                              b) Rb                              c) Ca                              d) Be
447. Which compound is used in photography?

- a)  $\text{Na}_2\text{SO}_5$                       b)  $\text{Na}_2\text{S}_2\text{O}_8$                       c)  $\text{Na}_2\text{S}_2\text{O}_6$                       d)  $\text{Na}_2\text{S}_2\text{O}_3$
448. The weakest base among  $\text{NaOH}$ ,  $\text{Ca}(\text{OH})_2$ ,  $\text{KOH}$  and  $\text{Be}(\text{OH})_2$  is:  
a)  $\text{NaOH}$                       b)  $\text{Ca}(\text{OH})_2$                       c)  $\text{KOH}$                       d)  $\text{Be}(\text{OH})_2$
449. Which chloride is covalent and soluble in ether?  
a)  $\text{BeCl}_2$                       b)  $\text{CaCl}_2$                       c)  $\text{CrCl}_3$                       d)  $\text{BaCl}_2$
450. Slaked lime [ $\text{Ca}(\text{OH})_2$ ] is used in the manufacture of  
a) Fire bricks                      b) Cement                      c) Medicine                      d) Pigment
451. Which one of the following is the highest melting halide?  
a)  $\text{NaCl}$                       b)  $\text{NaI}$                       c)  $\text{NaBr}$                       d)  $\text{NaF}$
452. The chemical formula of feldspar is  
a)  $\text{KAlSi}_3\text{O}_8$                       b)  $\text{Na}_3\text{AlF}_6$   
c)  $\text{NaAlO}_2$                       d)  $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 4\text{Al}(\text{OH})_3$
453. Which of the following properties of lithium does not show diagonal relationship with magnesium?  
a) Formation of  $\text{Li}^+$  ion                      b) Formation of  $\text{Li}_3\text{N}$   
c) Solubility of  $\text{LiHCO}_3$                       d) Thermal decomposition of  $\text{Li}_2\text{CO}_3$
454. Lithium is strongest reducing agent among alkali metals due to which of the following factor?  
a) Ionization energy                      b) Electron affinity                      c) Hydration energy                      d) Lattice energy
455.  $\text{Li}$ ,  $\text{Na}$  among alkali metals show properties of:  
a) Noble gases  
b) Transition metal  
c) Inner transition metals  
d) Representative elements
456. Caesium oxide will be:  
a) Very strongly basic                      b) Acidic                      c) Weakly basic                      d) Amphoteric
457. When ammoniacal solution of common salt is saturated with carbon dioxide, we get:  
a)  $\text{NH}_4\text{HCO}_3$                       b)  $(\text{NH}_4)_2\text{CO}_3$                       c)  $\text{NaHCO}_3$                       d)  $\text{MgCO}_3$
458. Microcosmic salt has the formula:  
a)  $\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$   
b)  $(\text{NH}_4)_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$   
c)  $\text{Na}(\text{NH}_4)\text{HPO}_4 \cdot 4\text{H}_2\text{O}$   
d) None of these
459. 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)  $\text{KH} > \text{NaH} > \text{LiH} > \text{CsH} > \text{RbH}$   
b)  $\text{NaH} > \text{LiH} > \text{KH} > \text{RbH} > \text{CsH}$   
c)  $\text{LiH} > \text{NaH} > \text{KH} > \text{RbH} > \text{CsH}$   
d)  $\text{CsH} > \text{RbH} > \text{KH} > \text{NaH} > \text{LiH}$
460. Which of the following has minimum values of cation-anion size ratio?  
a)  $\text{NaCl}$                       b)  $\text{KCl}$                       c)  $\text{MgCl}_2$                       d)  $\text{CaF}_2$
461. Chemical A is used for water softening to remove temporary hardness. A reacts with sodium carbonate to generate caustic soda. When  $\text{CO}_2$  is bubbled through A, it turns cloudy. What is A?  
a)  $\text{CaCO}_3$                       b)  $\text{CaO}$                       c)  $\text{Ca}(\text{OH})_2$                       d)  $\text{Ca}(\text{HCO}_3)_2$
462. Fusion of  $\text{AgCl}$  with  $\text{Na}_2\text{CO}_3$  gives:  
a)  $\text{Ag}_2\text{CO}_3$                       b) Silver carbide                      c)  $\text{Ag}$                       d)  $\text{Ag}_2$
463. Which alkaline earth metal forms complex salts?  
a)  $\text{Be}$                       b)  $\text{Mg}$                       c)  $\text{Ca}$                       d)  $\text{Ba}$
464. Which electronic configuration represents the configuration of the most electropositive element?  
a)  $[\text{He}]2s^1$                       b)  $[\text{Xe}]6s^1$                       c)  $[\text{He}]2s^2$                       d)  $[\text{Xe}]6s^2$
465. Le-blanc process is employed in the manufacture of  
a) Baking soda                      b) Washing soda                      c) Potash                      d) Plaster of Paris

466. Disodium hydrogen phosphate in presence of  $\text{NH}_4\text{Cl}$  and  $\text{NH}_4\text{OH}$  gives a white ppt. with a solution of  $\text{Mg}^{2+}$  ion. The precipitate is:  
 a)  $\text{Mg}(\text{H}_2\text{PO}_4)_2$                       b)  $\text{Mg}_3(\text{PO}_4)_2$                       c)  $\text{MgNH}_4\text{PO}_4$                       d)  $\text{MgHPO}_4$
467. Solubility of alkaline earth metal hydroxides increases from  $\text{Be}(\text{OH})_2$  to  $\text{Ba}(\text{OH})_2$  because:  
 a) Hydration energy > lattice energy  
 b) Lattice energy > hydration energy  
 c) Hydration energy is equal to lattice energy  
 d) None of the above
468. When a crystal of caustic soda is exposed to air, a liquid layer is deposited because:  
 a) Crystal melts  
 b) Crystal loses water  
 c) Crystal absorbs moisture and  $\text{CO}_2$   
 d) Crystal sublimates
469. The most soluble halide in water is:  
 a)  $\text{CaF}_2$                       b)  $\text{CaCl}_2$                       c)  $\text{CaBr}_2$                       d)  $\text{CaI}_2$
470. Which does not form double salt?  
 a)  $\text{Li}_2\text{SO}_4$                       b)  $\text{Na}_2\text{SO}_4$                       c)  $\text{K}_2\text{SO}_4$                       d)  $\text{Rb}_2\text{SO}_4$
471. The metallic lustre exhibited by sodium is due to:  
 a) Diffusion of  $\text{Na}^+$  ions  
 b) Oscillation of loose electrons  
 c) Excitation of free protons  
 d) Existence of body centred cubic lattice
472. The activity of alkaline earth metals as reducing agents  
 a) Decreases from Be to Ba  
 b) Increases from Be to Ba  
 c) Increases from Be to Ca and decreases from Ca to Ba  
 d) Decreases from Be to Ca and increases from Ca to Ba
473. The reaction of sodium thiosulphate with  $\text{I}_2$  gives:  
 a) Sodium sulphide                      b) Sodium sulphite                      c) Sodium sulphate                      d) Sodium tetrathionate
474. The main constituent of egg-shells is:  
 a)  $\text{CaCO}_3$                       b)  $\text{CaSiO}_3$                       c)  $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$                       d)  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
475. Which of the following is weakest base?  
 a)  $\text{Zn}(\text{OH})_2$                       b)  $\text{NaOH}$                       c)  $\text{Ca}(\text{OH})_2$                       d)  $\text{KOH}$
476. Nitrates of I group (except  $\text{LiNO}_3$ ) on heating give:  
 a)  $\text{O}_2$                       b)  $\text{N}_2$                       c)  $\text{NO}$                       d)  $\text{NO}_2$
477. Which alkali metal emits largest wavelength in the flame test?  
 a) Na                      b) Li                      c) K                      d) Cs
478. The solubilities of carbonates decrease down the magnesium group due to decrease in  
 a) Lattice energies of solids                      b) Hydration energies of cations  
 c) Interionic attraction                      d) Entropy of solution formation
479. The bleaching action of bleaching powder is due to the formation of:  
 a)  $\text{CaCl}_2$                       b)  $\text{CaSO}_4$                       c)  $\text{HClO}$                       d)  $\text{Ca}(\text{ClO}_3)_2$
480. Which is industrially prepared by the electrolysis of aqueous  $\text{NaCl}$ ?  
 a)  $\text{Na}_2\text{CO}_3$                       b)  $\text{NaHCO}_3$                       c)  $\text{NaOH}$                       d)  $\text{NaOCl}$
481. Which alkaline earth metal shows some anomalous behaviour and has the same electronegativity as aluminium?  
 a) Ba                      b) Sr                      c) Ca                      d) Be
482. Oxone is name given to:  
 a) Ozone                      b) Sodium peroxide                      c) Sodium oxide                      d) Sodamide
483. Barium is extracted from its ore:

- a) Dolomite                      b) Witherite                      c) Carnallite                      d) Gypsum
484. A chloride dissolves appreciably in cold water. When placed on a platinum wire in Bunsen flame, no distinctive colour is noticed. Which one is cation?  
 a)  $Mg^{2+}$                       b)  $Ba^{2+}$                       c)  $Pb^{2+}$                       d)  $Ca^{2+}$
485. Which of the following sulphates has the highest solubility?  
 a)  $BeSO_4$                       b)  $MgSO_4$                       c)  $BaSO_4$                       d)  $CaSO_4$
486. The chemistry of lithium is very much similar to that of magnesium even though they are placed in different groups. The reason is:  
 a) Both have nearly the same size  
 b) The ratio of their charge to size is nearly the same  
 c) Both have similar electronic configuration  
 d) Both are found together in nature
487. Solvay process is used for the manufacture of  
 a) NaOH                      b)  $Na_2CO_3$                       c)  $NH_3$                       d) NaCl
488. Consider the following abbreviations for hydrated alkali ions.  
 $X = [Li(H_2O)_n]^+$   
 $Y = [K(H_2O)_n]^+$   
 $Z = [Cs(H_2O)_n]^+$   
 What is the correct order of size of these hydrated alkali ions?  
 a)  $X > Y > Z$                       b)  $Z > Y > X$                       c)  $X = Y = Z$                       d)  $Z > X > Y$
489. Which hydride is most stable?  
 a) CsH                      b) NaH                      c) KH                      d) LiH
490. Least abundant metal in IIA group is:  
 a) Sr                      b) Ca                      c) Ra                      d) Be
491. Ra is placed at the bottom of alkaline earth metals. The element should:  
 a) Have the highest atomic volume  
 b) Possess the minimum density  
 c) Be less easily ionizable  
 d) Be least electropositive
492. Who discovered radium?  
 a) Bohr                      b) Fermi                      c) Curie                      d) Rutherford
493. Which gives least basic oxide?  
 a) Mg                      b) Ba                      c) Be                      d) Ra
494. The decomposition temperature is maximum for  
 a)  $MgCO_3$                       b)  $CaCO_3$                       c)  $BaCO_3$                       d)  $SrCO_3$
495. Which liberates  $SO_2$  with dilute  $H_2SO_4$ ?  
 a)  $Na_2SO_4$                       b)  $NaHSO_4$                       c)  $Na_2SO_3$                       d)  $Na_2S$
496. Gun powder is:  
 a)  $KNO_3 + Charcoal + S$     b)  $NaNO_3 + KNO_3 + S$     c)  $NaNO_3 + S$                       d) None of these
497. Sorrel's cement is  
 a) Portland cement + MgO                      b)  $MgCl_2 \cdot CaSiO_3 \cdot 2H_2O$   
 c)  $MgCl_2 \cdot 5MgO \cdot xH_2O$                       d)  $CaSiO_3 \cdot MgCO_3$
498. Zinc carbonate can be obtained from a solution of zinc chloride by adding:  
 a)  $NaHCO_3$                       b)  $Na_2CO_3$                       c)  $CaCO_3$                       d)  $MgCO_3$
499. Calcium phosphide is:  
 a)  $Ca_3F_2$                       b)  $Ca_2P_3$                       c)  $CaP_2$                       d)  $Ca_3P$
500. Which alkali metal reacts with nitrogen to form nitride?  
 a) Li                      b) Na                      c) Cs                      d) None of these
501. The metal ion, that plays an important role in muscle contraction, is  
 a)  $Be^{2+}$                       b)  $Mg^{2+}$                       c)  $Ca^{2+}$                       d)  $Ba^{2+}$

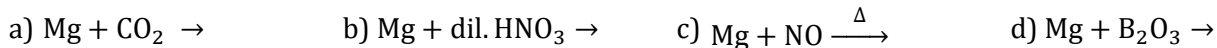
502. Which of the following on thermal decomposition yields a basic as well as an acidic oxide?  
 a)  $\text{KClO}_3$                       b)  $\text{CaCO}_3$                       c)  $\text{NH}_4\text{NO}_3$                       d)  $\text{NaNO}_3$
503. Sorel's cement is  
 a) Portland cement +  $\text{MgO}$                       b)  $\text{MgCl}_2 \cdot \text{CaSiO}_3 \cdot 2\text{H}_2\text{O}$   
 c)  $\text{CaSiO}_3 \cdot \text{MgCO}_3$                       d)  $\text{MgCl}_2 \cdot 5\text{MgO} \cdot x\text{H}_2\text{O}$
504. When KI is added to acidified solution of sodium nitrite then  
 a)  $\text{NO}$  gas is liberated and  $\text{I}_2$  is set free                      b)  $\text{N}_2$  gas is liberated and HI is produced  
 c)  $\text{N}_2\text{O}$  gas is liberated and  $\text{I}_2$  is set free                      d)  $\text{N}_2$  gas is liberated and HOI is produced
505. Baryta is:  
 a)  $\text{BaO}$                       b)  $\text{BaSO}_4$                       c)  $\text{BaCO}_3$                       d)  $\text{Ba(OH)}_2$
506. Which pair cannot exist together in solution?  
 a)  $\text{NaHCO}_3$  and  $\text{NaOH}$                       b)  $\text{NaHCO}_3$  and  $\text{NaCl}$                       c)  $\text{NaHCO}_3$  and  $\text{Na}_2\text{CO}_3$                       d)  $\text{NaCl}$  and  $\text{Na}_2\text{CO}_3$
507.  $\text{CaCl}_2$  is used as  
 a) Disinfectant                      b) Desiccating agent                      c) Medicine                      d) None of these
508. When carbon monoxide is passed over solid caustic soda heated to  $200^\circ\text{C}$ , it forms  
 a)  $\text{Na}_2\text{CO}_3$                       b)  $\text{NaHCO}_3$                       c)  $\text{HCOONa}$                       d)  $\text{CH}_3\text{COONa}$
509. When  $\text{HCl}$  gas is passed through saturated solution of  $\text{BaCl}_2$  a white ppt. is obtained. This is due to:  
 a) Impurities in  $\text{BaCl}_2$   
 b) Impurities in  $\text{HCl}$   
 c) Precipitation of  $\text{BaCl}_2$   
 d) Formation of complex
510.  $\text{NaOH}$  is prepared by the electrolysis of:  
 a) Aqueous solution of sodium chloride with platinum electrode  
 b) Molten sodium chloride with graphite anode and iron cathode  
 c) Sodium carbonate with platinum electrodes  
 d) Sodium carbonate with nickel electrodes
511. Oxygen is obtained from bleaching powder by:  
 a) The action of dilute acid  
 b) The action of alkali  
 c) Heating it with lime  
 d) Heating it with cobalt salt
512. Aqueous solution of  $\text{Na}_2\text{S}_2\text{O}_3$  on reaction with  $\text{Cl}_2$  gives  
 a)  $\text{Na}_2\text{S}_4\text{O}_6$                       b)  $\text{NaHSO}_4$                       c)  $\text{NaCl}$                       d)  $\text{NaOH}$
513. Washing soda is:  
 a)  $\text{Na}_2\text{CO}_3$                       b)  $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$                       c)  $\text{Na}_2\text{CO}_3 \cdot 7\text{H}_2\text{O}$                       d)  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
514. Element found in plant systems which forms an important constituent of photosynthesis is:  
 a)  $\text{Fe}$                       b)  $\text{Cu}$                       c)  $\text{Na}$                       d)  $\text{Mg}$
515. Chlorine reacts with 'X' to form bleaching powder. 'X' is  
 a) Dry slaked lime                      b) Sodium hydroxide                      c) Acetone                      d) Chloral
516. Hesse's process is a method for the manufacture of:  
 a)  $\text{NaOH}$                       b)  $\text{HNO}_3$                       c)  $\text{H}_2\text{SO}_4$                       d) Bleaching powder
517. The most dangerous method of preparing hydrogen would be by the action of  $\text{HCl}$  on:  
 a)  $\text{Zn}$                       b)  $\text{Fe}$                       c)  $\text{K}$                       d)  $\text{Al}$
518. Which ion forms a hydroxide highly soluble in water?  
 a)  $\text{Ni}^{2+}$                       b)  $\text{K}^+$                       c)  $\text{Zn}^{2+}$                       d)  $\text{Al}^{3+}$
519. Which one of the following is formed on dissolving  $\text{I}_2$  in aqueous solution of  $\text{KI}$ ?  
 a)  $\text{KIO}_4$                       b)  $\text{KIO}$                       c)  $\text{KI}_3$                       d)  $\text{KIO}_3$
520. Beryllium and aluminium exhibit many properties which are similar. But, the two elements differ in  
 a) Exhibiting maximum covalency in compounds                      b) Forming polymeric hydrides  
 c) Forming covalent halides                      d) Exhibiting amphoteric nature in their oxides

521. Electrolysis of fused  $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$  gives:
- Potassium only
  - Magnesium only
  - Magnesium and chlorine
  - Potassium, magnesium and chlorine
522. The metal  $X$  is prepared by the electrolysis of fused chloride. It reacts with hydrogen to form a colourless solid from which hydrogen is released on treatment with water. The metal is:
- Al
  - Ca
  - Cu
  - Zn
523. The molecular formula of potash alum is
- $\text{KAl}_2\text{S}_4\text{H}_{48}\text{O}_{40}$
  - $\text{K}_2\text{Al}_2\text{S}_4\text{H}_{48}\text{O}_{39}$
  - $\text{K}_2\text{Al}_2\text{S}_4\text{H}_{48}\text{O}_{40}$
  - $\text{KAl}_2\text{S}_4\text{H}_{48}\text{O}_{40}$
524. Dolomite is a carbonate ore of:
- Ca
  - Mg
  - Both Ca and Mg
  - Neither Ca nor Mg
525. Which is known as crystal carbonate?
- $\text{Na}_2\text{CO}_3$
  - $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$
  - $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
  - None of these
526. Which is used in preparation of portland cement?
- Limestone, clay and sand
  - Limestone, gypsum and sand
  - Limestone, gypsum and alumina
  - Limestone, clay and gypsum
527. The most electropositive element in alkali metals, is
- Na
  - K
  - Rb
  - Cs
528. Caustic soda is:
- Efflorescent
  - Deliquescent
  - Hygroscopic
  - Oxidant
529. Photoelectric effect is maximum in
- Cs
  - Na
  - K
  - Li
530. The solubilities of carbonates of magnesium group decreases down due to decrease in:
- Inter ionic attractions
  - Entropy of solution formation
  - Lattice energy
  - Hydration energy of cation
531. Highly pure dilute solution of sodium in liquid ammonia:
- Shows blue colour
  - Do not exhibit electrical conductivity
  - Produces sodium amide
  - Produces hydrogen gas
532. Tincal is:
- $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
  - $\text{NaNO}_3$
  - $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$
  - NaCl
533. In the Castner's process for the extraction of sodium, the anode is made of ..... metal
- Sodium
  - Nickel
  - Copper
  - Iron
534. Which one of the following is true?
- NaOH is used in the concentration of bauxite ore.
  - NaOH is a primary standard in volumetric analysis.
  - Manganous hydroxide is soluble in excess of NaOH solution.
  - NaOH solution does not react with Cl.
535. Anhydrous magnesium chloride can be prepared by heating  $\text{MgCl}_2 \cdot 2\text{H}_2\text{O}$ :
- In a current of dry HCl gas
  - With carbon
  - Until it fuses
  - With lime
536. The yellow light for illumination of lamps is from:

- a) Mercury vapour lamp  
 b) Sodium vapour lamp  
 c) Neon gas lamp  
 d) None of these
537. Thomas slag is referred to as  
 a) Calcium silicate      b) Calcium phosphate      c) Barium phosphate      d) Strontium silicate
538. Among the following, which is water insoluble?  
 a) Sodium fluoride      b) Potassium fluoride      c) Beryllium fluoride      d) Magnesium fluoride
539. Which of the following oxides is formed when potassium metal is burnt in excess of air?  
 a)  $\text{KO}_2$       b)  $\text{K}_2\text{O}_2$       c)  $\text{KO}$       d)  $\text{K}_2\text{O}$
540. Calcium cyanamide reacts with steam to form ammonia and.....  
 a)  $\text{Ca(OH)}_2$       b)  $\text{CaO}$       c)  $\text{Ca(HCO}_3)_2$       d)  $\text{CaCO}_3$
541. Thermal decomposition of which compound yields a basic and acidic oxide simultaneously?  
 a)  $\text{KClO}_3$       b)  $\text{NH}_4\text{NO}_3$       c)  $\text{NaNO}_3$       d)  $\text{CaCO}_3$
542. Which one of the following will dissolve in water most readily?  
 a)  $\text{I}_2$       b)  $\text{BaCO}_3$       c)  $\text{KF}$       d)  $\text{PbI}_2$
543. Which group of elements lose electrons more readily?  
 a) Li, Na, K      b)  $\text{F}_2, \text{Cl}_2, \text{Br}_2$       c) N, P, As      d) O, S, Sc
544. The nitride ion in lithium nitride is composed of:  
 a) 7 protons +7 electrons  
 b) 10 protons +7 electrons  
 c) 7 protons +10 electrons  
 d) 10 protons +10 electrons
545. A firework gave bright crimson light. It is probably a salt of:  
 a) Ca      b) Sr      c) Ba      d) Mg
546. One of the elements present in carnallite shows flame colouration. The colour of the flame is  
 a) Orange      b) Green      c) Yellow      d) Lilac
547. Which of the following dissolves in hot conc.  $\text{NaOH}$  solution?  
 a) Fe      b) Zn      c) Cu      d) Ag
548. Alkali metals have high oxidation potential and hence, they behave as  
 a) Oxidising agents      b) Lewis bases      c) Reducing agents      d) Electrolytes
549. The electrolyte employed in the extraction of sodium by Down's electrolysis method is:  
 a) An aqueous solution of  $\text{NaCl}$   
 b) Molten  $\text{NaCl}$   
 c) Molten  $\text{NaOH}$   
 d) A molten mixture of  $\text{MgCl}_2$  and  $\text{NaCl}$
550. Which of the following represents calcium chlorite?  
 a)  $\text{Ca(ClO}_2)_2$       b)  $\text{CaClO}_2$       c)  $\text{Ca(ClO}_3)_2$       d)  $\text{Ca(ClO}_4)_2$
551. Which compound gives acetylene on reaction with water?  
 a)  $\text{Al}_4\text{C}_3$       b)  $\text{Mg}_3\text{N}_2$       c)  $\text{CaC}_2$       d)  $\text{CaH}_2$
552. Which represents nitrolime?  
 a)  $\text{CaCN}_2 + \text{C}$       b)  $\text{CaC}_2 + \text{N}_2$       c)  $\text{Ca(CN)}_2 + \text{Ca(NO}_3)_2$       d) None of these
553. The substance not likely to contain  $\text{CaCO}_3$  is  
 a) A marble statue      b) Calcined gypsum      c) Sea shells      d) Dolomite
554. What are the metal ions present in carnallite?  
 a) Mg, K      b) Al, Na      c) Na, Mg      d) Zn, Mg
555. Sodium reacts with water less vigorously than potassium because:  
 a) It has higher atomic weight  
 b) It is less electropositive  
 c) It is more electronegative  
 d) It is a metal



556. In which of the following reactions, MgO is not formed?



557. Which metal is present in chlorophyll?

- a) Ca      b) Co      c) Zn      d) Mg

558.  $\text{LiAlH}_4$  is used as:

- a) An oxidizing agent      b) A reducing agent      c) A mordant      d) A water softener

559. Which metal does not form ionic hydride?

- a) Ba      b) Mg      c) Ca      d) Sr

560. Which of the following metal carbonates decomposes on heating?

- a)  $\text{MgCO}_3$       b)  $\text{Na}_2\text{CO}_3$       c)  $\text{K}_2\text{CO}_3$       d)  $\text{Rb}_2\text{CO}_3$

561. Magnesium has polarizing power closer to that of:

- a) Lithium      b) Sodium      c) Potassium      d) Caesium

562. The ionic carbide is:

- a)  $\text{CaC}_2$       b)  $\text{ZnC}$       c)  $\text{SiC}$       d)  $\text{TiC}$

563. The correct order of solubility of the sulphates of alkaline earth metals in water is

- a)  $\text{Be} > \text{Ca} > \text{Mg} > \text{Ba} > \text{Sr}$       b)  $\text{Mg} > \text{Be} > \text{Ba} > \text{Ca} > \text{Sr}$   
c)  $\text{Be} > \text{Mg} > \text{Ca} > \text{Sr} > \text{Ba}$       d)  $\text{Mg} > \text{Ca} > \text{Ba} > \text{Be} > \text{Sr}$

564. Compared with the alkaline earth metals, the alkali metals exhibit

- a) Greater hardness      b) Smaller ionic radii  
c) Lower ionisation energies      d) Highest boiling points

# THE S-BLOCK ELEMENTS

## CHEMISTRY

### : ANSWER KEY :

1)	a	2)	a	3)	b	4)	b	169)	d	170)	d	171)	d	172)	c
5)	b	6)	a	7)	d	8)	c	173)	d	174)	b	175)	d	176)	c
9)	b	10)	c	11)	a	12)	c	177)	b	178)	b	179)	d	180)	a
13)	c	14)	a	15)	c	16)	d	181)	d	182)	b	183)	c	184)	a
17)	c	18)	d	19)	b	20)	a	185)	d	186)	d	187)	b	188)	b
21)	b	22)	b	23)	d	24)	d	189)	a	190)	b	191)	a	192)	a
25)	d	26)	b	27)	a	28)	d	193)	b	194)	a	195)	b	196)	c
29)	a	30)	d	31)	a	32)	b	197)	d	198)	a	199)	c	200)	b
33)	b	34)	d	35)	a	36)	a	201)	b	202)	c	203)	c	204)	d
37)	c	38)	b	39)	d	40)	c	205)	b	206)	d	207)	b	208)	d
41)	b	42)	d	43)	a	44)	c	209)	a	210)	a	211)	a	212)	b
45)	a	46)	d	47)	b	48)	a	213)	d	214)	d	215)	b	216)	c
49)	a	50)	d	51)	a	52)	a	217)	a	218)	a	219)	a	220)	d
53)	a	54)	a	55)	a	56)	d	221)	c	222)	d	223)	b	224)	c
57)	b	58)	c	59)	b	60)	d	225)	d	226)	b	227)	c	228)	d
61)	a	62)	c	63)	c	64)	c	229)	b	230)	c	231)	a	232)	b
65)	a	66)	d	67)	a	68)	a	233)	a	234)	a	235)	d	236)	c
69)	d	70)	c	71)	c	72)	c	237)	d	238)	d	239)	c	240)	b
73)	d	74)	c	75)	a	76)	a	241)	d	242)	c	243)	b	244)	d
77)	d	78)	c	79)	c	80)	a	245)	a	246)	c	247)	c	248)	c
81)	c	82)	c	83)	b	84)	b	249)	a	250)	d	251)	a	252)	d
85)	b	86)	a	87)	d	88)	a	253)	a	254)	d	255)	c	256)	d
89)	c	90)	a	91)	c	92)	b	257)	c	258)	b	259)	c	260)	a
93)	c	94)	c	95)	d	96)	b	261)	b	262)	d	263)	b	264)	a
97)	b	98)	d	99)	b	100)	d	265)	a	266)	a	267)	b	268)	b
101)	c	102)	b	103)	d	104)	c	269)	c	270)	a	271)	b	272)	c
105)	c	106)	b	107)	b	108)	d	273)	a	274)	c	275)	a	276)	b
109)	b	110)	c	111)	b	112)	b	277)	b	278)	c	279)	a	280)	a
113)	b	114)	d	115)	a	116)	d	281)	a	282)	c	283)	b	284)	b
117)	c	118)	a	119)	a	120)	c	285)	a	286)	b	287)	d	288)	b
121)	a	122)	a	123)	c	124)	a	289)	a	290)	c	291)	c	292)	c
125)	b	126)	c	127)	b	128)	d	293)	c	294)	d	295)	a	296)	b
129)	b	130)	b	131)	d	132)	a	297)	c	298)	c	299)	c	300)	d
133)	b	134)	a	135)	c	136)	d	301)	c	302)	a	303)	d	304)	d
137)	d	138)	d	139)	a	140)	a	305)	a	306)	d	307)	d	308)	a
141)	c	142)	d	143)	a	144)	b	309)	b	310)	b	311)	a	312)	c
145)	d	146)	b	147)	d	148)	b	313)	b	314)	d	315)	a	316)	c
149)	c	150)	b	151)	a	152)	c	317)	b	318)	b	319)	b	320)	a
153)	d	154)	a	155)	b	156)	c	321)	c	322)	b	323)	c	324)	a
157)	d	158)	c	159)	d	160)	b	325)	b	326)	c	327)	b	328)	a
161)	b	162)	b	163)	b	164)	b	329)	a	330)	d	331)	a	332)	a
165)	c	166)	c	167)	d	168)	d	333)	b	334)	a	335)	b	336)	d

337) c	338) b	339) c	340) d	541) d	542) c	543) a	544) c
341) a	342) b	343) c	344) a	545) b	546) d	547) b	548) c
345) c	346) d	347) a	348) d	549) b	550) a	551) c	552) a
349) d	350) b	351) a	352) a	553) b	554) a	555) b	556) b
353) c	354) a	355) d	356) c	557) d	558) b	559) b	560) a
357) b	358) c	359) c	360) d	561) a	562) a	563) c	564) c
361) c	362) a	363) c	364) a				
365) d	366) a	367) a	368) c				
369) d	370) c	371) c	372) b				
373) b	374) b	375) a	376) c				
377) a	378) d	379) d	380) a				
381) b	382) c	383) d	384) c				
385) b	386) a	387) a	388) b				
389) c	390) d	391) a	392) d				
393) c	394) b	395) a	396) c				
397) b	398) a	399) a	400) d				
401) d	402) c	403) d	404) d				
405) b	406) a	407) b	408) d				
409) b	410) d	411) d	412) b				
413) c	414) d	415) a	416) a				
417) c	418) c	419) c	420) b				
421) c	422) a	423) d	424) c				
425) a	426) b	427) b	428) b				
429) c	430) a	431) b	432) d				
433) c	434) a	435) a	436) d				
437) b	438) b	439) b	440) b				
441) d	442) c	443) a	444) b				
445) b	446) d	447) d	448) d				
449) a	450) a	451) d	452) a				
453) a	454) c	455) d	456) a				
457) c	458) c	459) c	460) c				
461) c	462) c	463) a	464) b				
465) c	466) c	467) a	468) c				
469) d	470) a	471) b	472) b				
473) d	474) a	475) a	476) a				
477) b	478) b	479) c	480) c				
481) d	482) b	483) b	484) a				
485) a	486) b	487) b	488) a				
489) d	490) c	491) a	492) c				
493) c	494) c	495) c	496) a				
497) c	498) a	499) a	500) a				
501) c	502) b	503) d	504) a				
505) a	506) c	507) b	508) c				
509) c	510) b	511) a	512) b				
513) d	514) d	515) a	516) d				
517) c	518) b	519) c	520) a				
521) d	522) b	523) c	524) c				
525) b	526) d	527) d	528) b				
529) a	530) d	531) a	532) c				
533) b	534) a	535) a	536) b				
537) b	538) d	539) a	540) d				

# THE S-BLOCK ELEMENTS

## CHEMISTRY

### : HINTS AND SOLUTIONS :

- 1 **(a)**  
 $\text{KO}_2$  absorbs  $\text{CO}_2$  and increases  $\text{O}_2$  concentration so, it is used in space and submarines.
- 3 **(b)**  
 $\text{BeCl}_2$  exists in polymeric form.
- 4 **(b)**  
 Alkali metals on burning in air give monoxide, peroxide or superoxide.  
 Li forms monoxide.  

$$2\text{Li} + \frac{1}{2}\text{O}_2 \rightarrow \text{Li}_2\text{O}$$
 Na form peroxide as well as monoxide.  

$$2\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}_2$$

$$2\text{Na} + \frac{1}{2}\text{O}_2 \rightarrow \text{Na}_2\text{O}$$
 K, Rb, and Cs form superoxide.  

$$M (= \text{K, Rb, Cs}) + \text{O}_2 \rightarrow \text{MO}_2$$
- 5 **(b)**  
 It is a fact.
- 6 **(a)**  
 Lime stone is not used in the extraction of phosphorus from phosphorite  $[\text{Ca}_3(\text{PO}_4)_2]$
- 7 **(d)**  
 $\text{Na}_2\text{S}_2\text{O}_3$  or  $2\text{Na}^+ + \text{S}_2\text{O}_3^{2-}$   

$$\text{S}_2\text{O}_3^{2-} + \text{I}_2 \rightarrow \text{S}_4\text{O}_6^{2-} + \text{I}^-$$
*i.e.*, 
$$2\text{Na}_2\text{S}_2\text{O}_3 + \text{I}_2 \rightarrow \text{Na}_2\text{S}_4\text{O}_6 + 2\text{NaI}$$
- 8 **(c)**  

$$\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \underset{\text{Insoluble}}{\text{CaCO}_3} + \text{H}_2\text{O}$$

$$\text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow \underset{\text{Soluble}}{\text{Ca}(\text{HCO}_3)_2}$$
- 9 **(b)**  

$$\text{BaO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{H}_2\text{O}_2 + \text{BaSO}_4$$
- 10 **(c)**  
 $\text{Ca}(\text{OH})_2$  is also known as milk of lime.
- 12 **(c)**  
 Celestine is  $\text{SrSO}_4$ .
- 13 **(c)**  

$$\text{Ca}_3\text{P}_2 + 6\text{H}_2\text{O} \rightarrow 3\text{Ca}(\text{OH})_2 + \text{PH}_3 \uparrow$$
 phosphine
- $$\text{CaC}_2 + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{C}_2\text{H}_2 \uparrow$$
 acetylene
- $$\text{CaCN}_2 + 3\text{H}_2\text{O} \rightarrow \text{CaCO}_3 + 2\text{NH}_3 \uparrow$$
 ammonia
- 14 **(a)**  
 $\text{MgO}$  is called magnesia.
- 15 **(c)**  
 Calcium is obtained by electrolysis of a fused mass of  $\text{CaCl}_2$  and  $\text{KCl}$  at about  $700^\circ\text{C}$  in an electrolytic cell made of graphite anode and iron cathode.  

$$\text{CaCl}_2 \rightleftharpoons \text{Ca}^{2+} + 2\text{Cl}^-$$
**At anode**  

$$2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$$
**At cathode**  

$$\text{Ca}^{2+} + 2\text{e}^- \rightarrow \text{Ca}$$
- 16 **(d)**  
 $\text{NaCl}$  is table salt; rest all are potassium salts.
- 17 **(c)**  
 A characteristic feature of Na-K alloy.
- 18 **(d)**  
 Carnallite is an ore of potassium and magnesium *i.e.*,  $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ .
- 19 **(b)**  

$$\text{CO}_3^{2-} + \text{H}_2\text{O} \rightleftharpoons \text{HCO}_3^- + \text{OH}^-$$
- 20 **(a)**  
 When  $\text{AlCl}_3$  reacts with  $\text{NaOH}$ , it forms sodium meta aluminate ( $\text{NaAlO}_2$ ). This reaction does not give gaseous product.  

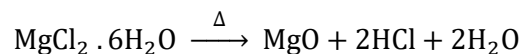
$$\text{AlCl}_3 + 4\text{NaOH} \rightarrow \text{NaAlO}_2 + 2\text{H}_2\text{O} + 3\text{NaCl}$$
 sodium meta aluminate  
 (soluble)
- 21 **(b)**  

$$\text{CaOCl}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{Cl}_2$$

$$1 \text{ mol of } \text{Cl}_2 = 2 \times 35.5 \text{ g } \text{Cl}_2 = 71.0 \text{ g } \text{Cl}_2$$
- 22 **(b)**  
 Due to formation of  $\text{Na}_2\text{CrO}_4$ .
- 23 **(d)**  
 $\text{CaI}_2$  has maximum covalent character due to large size of anion and possesses lowest lattice energy. Thus melting point is lowest.

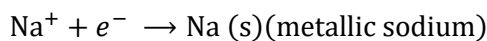
- 24 **(d)**  
Farther away is shell from the nucleus, more loosely are held electrons.
- 25 **(d)**  
 $\text{CaO} + 3\text{C} \rightarrow \text{CaC}_2 + \text{CO}$
- 26 **(b)**  
Mg and Be do not impart colour of flame.
- 28 **(d)**  
 $\text{BaSO}_4$  has high lattice energy and low hydration energy.
- 29 **(a)**  
It is a fact.
- 30 **(d)**  
 $\text{Be}(\text{OH})_2$  is insoluble in water and thus, possess lowest  $K_{sp}$  value.
- 31 **(a)**  
(i) As we go down in group, in group. I, ionisation potential decreases and dissociation ( $M - \text{OH}$ ) bond becomes easier.  
  
(ii) The hydroxide which can give  $\text{OH}^-$  ion most easily will have highest basicity.  
  
 $\therefore$  Ionisation energy of Cs is least among Li, Na, K, Cs  
  
 $\therefore$  CsOH furnishes  $\text{OH}^-$  most easily.  
  
 $\therefore$  CsOH is most basic.
- 32 **(b)**  
 $\text{O}_2^{1-}$  can be oxidised to  $\text{O}_2$  and can be reduced to  $\text{O}^{2-}$ .
- 33 **(b)**  
Alkali metals are electropositive, hence they can reduce  $\text{CO}_2$ .  
$$4\text{Na} + \text{CO}_2 \rightarrow 2\text{Na}_2\text{O} + \text{C}$$
- 34 **(d)**  
CaO (quick lime)  
  
Ca(OH)<sub>2</sub> – (slaked lime)  
$$\text{Ca}(\text{OH})_2 + \text{H}_2\text{O}$$
  
→ an aqueous suspension of Ca(OH)<sub>2</sub> in water, call  
CaCO<sub>3</sub> (lime stone)
- 35 **(a)**  
Pearl ash is  $\text{K}_2\text{CO}_3$ ; caustic potash is KOH.
- 36 **(a)**  
It is a fact.
- 37 **(c)**  
The solubility of hydroxides increases down the

- group.
- 38 **(b)**  
On strong heating,  $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$  is hydrolysed by its own water of crystallisation.

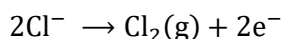


- 39 **(d)**  
It is a fact.
- 40 **(c)**  
Ionic radius increases down the gp.
- 41 **(b)**  
$$\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$$
  
bleaching powder
- 42 **(d)**  
All are fact. It is the ammonia solvated electron ( $\text{NH}_3$ )<sub>x</sub>. *e* responsible for these properties.
- 43 **(a)**  
Conductance of an ion is dependent upon its size – as follows :  
$$\text{Ionic conductance} \propto \frac{1}{\text{ionic size}}$$
  
Thus, ionic conductance in aqueous solution increases in the order-  
$$\text{Cs}^+ < \text{Rb}^+ < \text{K}^+ < \text{Na}^+ < \text{Li}^+$$
- 44 **(c)**  
$$\text{Ba}^+ + e \rightarrow \text{Ba}$$
  
$$\text{Be}^+ \rightarrow \text{Be}^{2+} + e$$
- 45 **(a)**  
It is a fact.
- 46 **(d)**  
Scarlet red flame-Sr; Chrimson red-Ca; Apple green-Ba
- 47 **(b)**  
Among the alkaline earth metals, the size of beryllium and magnesium metals is very small. Therefore, the electrons in these metals are bounded more strongly and are not excited by the energy of flame to higher energy states. Hence, these metals or their salts do not impart any colour to the flame.
- 48 **(a)**  
Sodium metal is manufactured by the electrolysis of fused sodium chloride mixed with KCl and KF.  
  
On electrolysis ;

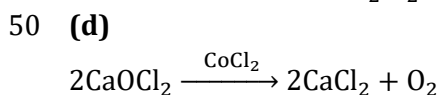
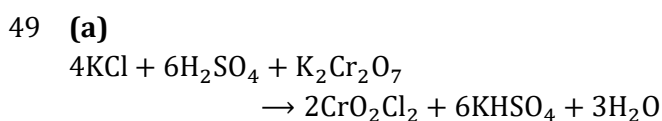
At iron cathode



At graphite anode :

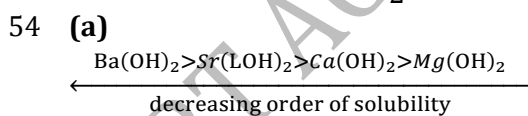
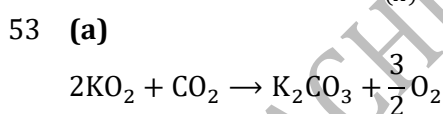
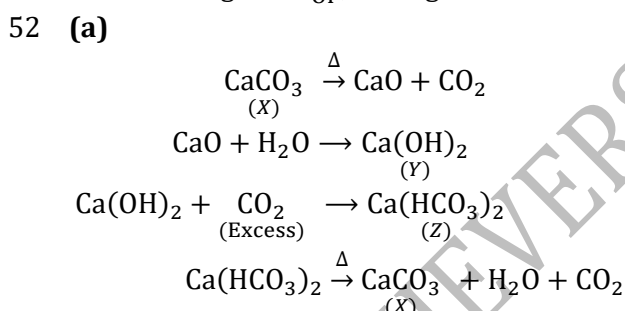


NaCl melts at 800°C. It is difficult to attain and maintain its melting point. So, KCl and KF are mixed to lower the melting point of NaCl to about 600°C. KCl and KF are themselves not electrolysed under the voltage conditions used for sodium.

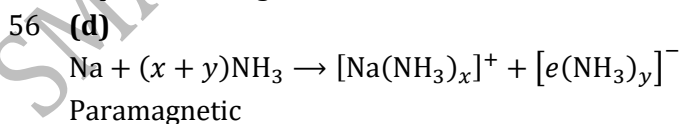


In presence of  $\text{CoCl}_2$  (which act as catalyst) bleaching powder gives out oxygen.

51 (a)  
Li has the highest  $E_{\text{OP}}^\circ$ , among all elements.



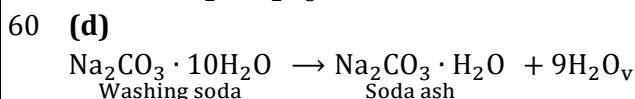
55 (a)  
M.p. order is  $\text{Mg} < \text{Ra} < \text{Ba} < \text{Sr} < \text{Ca} < \text{Be}$ .



57 (b)  
The solubility of alkaline earth metal hydroxides increase down the gp.  $\text{Zn(OH)}_2$  and  $\text{Al(OH)}_3$  are insoluble.

58 (c)  
Quicklime or CaO s very good hygroscopic substance.

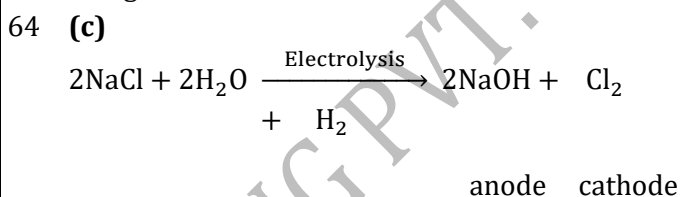
59 (b)  
Anhydrous  $\text{CaCl}_2$  is not used to dry alcohol as it forms  $\text{CaCl}_2 \cdot 4\text{C}_2\text{H}_5\text{OH}$  and also reacts with  $\text{NH}_3$ .



61 (a)  
It is a reason for given fact.

62 (c)  
It is a reason for the given fact.

63 (c)  
Mg forms complex, e.g., chlorophyll is a complex of Mg.



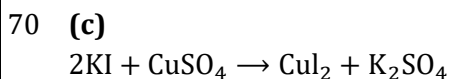
65 (a)  
It is also a method for manufacture of NaOH.

66 (d)  
Alkali metals react with halogen to give halides. They are normally represented by  $M^+X^-$ .

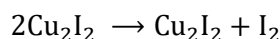
67 (a)  
Alkali metals are strongest reducing agents. Also, their reducing power increases down the group.

68 (a)  
 $\text{BaSO}_4$  is insoluble in acid. Refer test of  $\text{SO}_4^{2-}$ .

69 (d)  
The metallic character increases down the group.

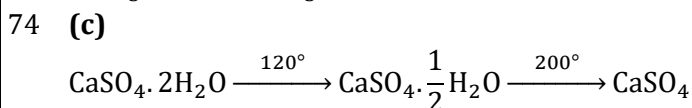
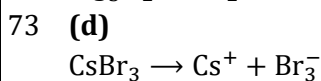
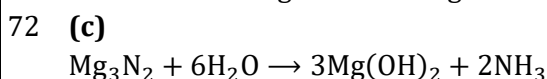


unstable



Hence, solution contains  $\text{Cu}_2\text{I}_2$ ,  $\text{I}_2$  and  $\text{K}_2\text{SO}_4$ .

71 (c)  
It is a reason for given fact for given fact



gypsum plaster of Paris anhydrite  
or dead burnt plaster

The anhydrous  $\text{CaSO}_4$  is called dead burnt plaster because it does not set like plaster of Paris when moistened with water.

- 75 (a)  
It is a fact.
- 76 (a)  
 $6\text{Li} + \text{N}_2 \rightarrow 2\text{Li}_3\text{N}$   
lithium nitride
- 78 (c)  
Atomic radii increase down the group.
- 79 (c)  
It is a fact.
- 80 (a)  
Carbon has no reaction with NaOH.
- 81 (c)  
Both  $\text{Be}(\text{OH})_2$  and  $\text{Al}(\text{OH})_3$  are amphoteric.
- 82 (c)  
It is a fact.
- 84 (b)  
It is a fact.
- 85 (b)  
Alkaline earth metals ( $ns^2$ ) are denser than alkali metal ( $ns^1$ ) because metallic bonding in alkaline earth metal is stronger
- 86 (a)  
Smaller is ion, more is hydration energy.
- 87 (d)  
Alkali and alkaline earth metals are extracted by the electrolysis of their fused salt.
- 88 (a)  
 $\text{Be}(\text{OH})_2$  has minimum basicity and has amphoteric character as it dissolves both in acid and in alkali.  
$$\text{Be}(\text{OH})_2 + 2\text{HCl} \rightarrow \text{BeCl}_2 + 2\text{H}_2\text{O}$$
$$\text{Be}(\text{OH})_2 + 2\text{NaOH} \rightarrow \text{Na}_2\text{BeO}_2 + 2\text{H}_2\text{O}$$
- 89 (c)  
Black ash is  $\text{Na}_2\text{CO}_3 + \text{CaS}$ .
- 90 (a)  
 $\text{Na}_2\text{CO}_3$  loses water on standing in air.
- 91 (c)  
Li, Na, K, Rb, Cs, Fr are I group members.
- 92 (b)  
Bicarbonates of alkaline earth metals exist only in solution state.
- 93 (c)

$\text{K}_2\text{CO}_3$  is potassium carbonate;  $\text{K}_2\text{CS}_2$  is pot. Thiocarbonate.

- 94 (c)  
 $\text{Be}(\text{OH})_2$  is amphoteric as it reacts with both acids and bases.
- 95 (d)  
 $\text{NaNO}_2$  gives  $\text{NO}_2$  (brown) with dil. Acids whereas  $\text{NaBr}$  and  $\text{NaNO}_2$  both give brown vapours  $\text{Br}_2$  and  $\text{NO}_2$  respectively with conc. acids.
- 96 (b)  
 $\text{CaO} + 3\text{C} \rightarrow \text{CaC}_2 + \text{CO}$
- 97 (b)  
Borax- $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ .
- 98 (d)  
More negative is heat of formation, greater is stability  $\Delta H_f =$   
 $-97.7, -98.6, -103.5, -104.2\text{kcal}$  for LiCl, NaCl, Cs respectively.
- 99 (b)  
The solubility of alkali metal hydroxides increases from top to bottom. Hence, the order of their solubility is as  
$$\text{LiOH} < \text{NaOH} < \text{KOH} < \text{RbOH} < \text{CsOH}$$
- 100 (d)  
 $\text{Na}_2\text{Cr}_2\text{O}_7$  is deliquescent and therefore not used as primary standard in volumetric analysis.
- 101 (c)  
$$2(\text{CaSO}_4 \cdot 2\text{H}_2\text{O}) \xrightarrow[\text{Dehydration}]{120^\circ\text{C}} 2\text{CaSO}_4 \cdot \text{H}_2\text{O} + 3\text{H}_2\text{O}$$
  
gypsum plaster of Paris
- 102 (b)  
Amongst the elements listed, caesium is the most electropositive, therefore, CsH shall be most ionic
- 103 (d)  
 $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2 \uparrow$   
 $2\text{NaOH} + \text{CO}_2 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$   
 $\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$   
$$\text{NaCl} \xrightarrow{\text{Electrolysis}} \text{Na}^+ + \text{Cl}^-$$
  
(molten)  
$$\begin{array}{ccc} \downarrow + e^- & & \downarrow - e^- \\ \text{Na} & & \text{Cl} \end{array}$$
- 104 (c)  
Both Ca and P are needed for human system. Also

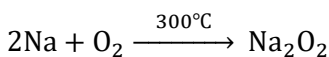
they prevent moisture absorbing power of other components present in table salt.

105 (c)

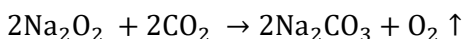
ZnS + BaSO<sub>4</sub> is lithopone. It is used as white pigment

106 (b)

The reaction is as follows



sodium peroxide (X)



(Y)

Sodium peroxide is used in the purification of air in submarines because it combines with CO<sub>2</sub> to give O<sub>2</sub>.

107 (b)

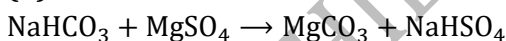
+ -



Sodium dissolves in liquid ammonia to produce deep blue colour in solution.

The blue coloured solution possesses high conducting power, strong reducing nature due to ammoniated electrons. The cation is also solvated by ammonia.

108 (d)



109 (b)

K belongs to strong electropositive group and Cl belongs to strong electronegative group.

110 (c)

Mg is more powerful reductant than carbon.

111 (b)

Li forms Li<sub>2</sub>O, Na forms Na<sub>2</sub>O<sub>2</sub> and rest all alkali metals form superoxides MO<sub>2</sub>.

113 (b)

Caustic soda (an alkali) can absorb acidic oxides.

114 (d)

Carnallite - KCl · MgCl<sub>2</sub> · 6H<sub>2</sub>O

It is an ore of magnesium.

115 (a)

Metal oxides are basic; non-metal oxides are acidic.

116 (d)

Cs has lowest ionisation energy and thus easily

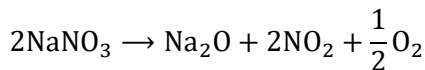
show photoelectric effect, the principle used in solar cells.

117 (c)

Ba imparts green colour to flame.

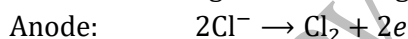
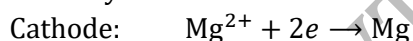
118 (a)

NaNO<sub>3</sub> decomposes on heating above 800 °C to give O<sub>2</sub>

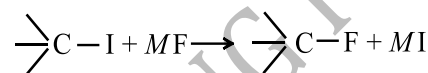


119 (a)

Highly electropositive metals (e.g., alkali and alkaline earth metals and Al) are extracted by the electrolysis of their fused salts.



120 (c)



It is Swart reaction that uses highly soluble metal fluorides. So, the correct choice is RbF.

121 (a)

In Holme's signal of the ship mixture of CaC<sub>2</sub> and Ca<sub>3</sub>P<sub>2</sub> is used.

122 (a)

The process is also known as Gossage process.

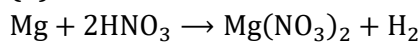
123 (c)

Cs<sup>+</sup>(aq) is the smallest alkali metal cation in solution state.

124 (a)

Indian saltpetre is KNO<sub>3</sub>.

125 (b)



126 (c)

It is a fact.

127 (b)

It is <sup>20</sup>Ca.

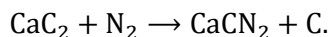
128 (d)

It is a fact.

129 (b)

It is a fact

130 (b)



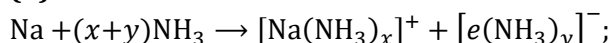
131 (d)

It is a fact.

132 (a)

Lithium salts impart bright red colour to the flame

133 (b)



This ammoniated electron is responsible for blue

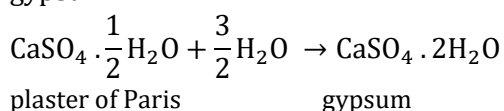


- colour of solution, reducing nature and good conductor nature of solution.
- 134 **(a)**  
 $(\text{CaSO}_4)_2 \cdot \text{H}_2\text{O}$  is plaster of Paris. Since, on adding water, it sets into a hard mass due to the formation of gypsum, it is used for plastering the broken bones.
- $$(\text{CaSO}_4)_2 \cdot \text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O} \rightarrow 2\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$$
- hard mass
- 135 **(c)**  
 $2\text{Mg} + \text{CO}_2 \rightarrow 2\text{MgO} + \text{C}$   
 Mg is more powerful reductant than carbon.
- 136 **(d)**  
 It should be  $\text{Na}_2\text{CO}_3 + \text{CaS}$ .
- 137 **(d)**  
 Plaster of Paris is a whit powder. It changes into a hard mass called gypsum on mixing with water. There is a slight increase in volume during this process.
- $$\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O} \rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O} + \text{Heat}$$
- Plaster of Paris           gypsum
- 138 **(d)**  
 Ba possesses lowest ionization potential.
- 139 **(a)**  
 $\text{Ca}(\text{HCO}_3)_2 + \text{Ca}(\text{OH})_2 \rightarrow 2\text{CaCO}_3 \downarrow + 2\text{H}_2\text{O}$   
 Hardness in water
- 140 **(a)**  
 $3\text{Mg} + \text{N}_2 \rightarrow \text{Mg}_3\text{N}_2 \xrightarrow{6\text{H}_2\text{O}} 3\text{Mg}(\text{OH})_2 + 2\text{NH}_3$
- 141 **(c)**  
 Gypsum is  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ .
- 142 **(d)**  
 Due to lower IP values alkali metals are strong reducing agent.
- 143 **(a)**  
 Water glass is  $\text{Na}_2\text{SiO}_3$ .
- 144 **(b)**  
 $4\text{LiH} + \text{AlCl}_3 \rightarrow \text{LiAlH}_4 + 3\text{LiCl}$
- 145 **(d)**  
 The solubility of alkaline earth metal chlorides decreases down the group.
- 146 **(b)**  
 It is a fact.
- 147 **(d)**  
 The ease of adsorption of hydrated alkali metal cations depends upon their size in hydrated form and on the charge carried by them.
- 148 **(b)**  
 $\text{Mg}^{2+}$  is smaller than  $\text{Na}^+$  and larger than all others. Smaller is ion, more is hydration energy.
- 149 **(c)**  
 Chile saltpetre is  $\text{NaNO}_3$ .
- 150 **(b)**  
 Thomas slag or phosphatic slag is a mixture of calcium phosphate and calcium silicate  $[\text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaSiO}_3]$ . It is used as manure.
- 151 **(a)**  
 Follow Solvay process for  $\text{Na}_2\text{CO}_3$ .
- 152 **(c)**  
 As we go down in the group, ionic character increases hence, melting point of halides should increase but NaCl has the highest melting point ( $800^\circ\text{C}$ ) due to its high lattice energy.
- 153 **(d)**  
 $\text{Na}_2\text{CO}_3$  is thermally stable.
- 154 **(a)**  
 Smaller is ion, more is hydration energy.
- 155 **(b)**  
 The ionic character order is,  
 $\text{NaF} > \text{NaCl} > \text{NaBr} > \text{NaI}$  (Fajan's rule).
- 156 **(c)**  
 $\text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow 2\text{NaHCO}_3$
- 157 **(d)**  
 Barium salts are quite stable because of great electropositive nature of Ba. Hence, Ba compounds possess high decomposition temperature.
- 158 **(c)**  
 Alkaline earth metal carbonates are insoluble in water and lose  $\text{CO}_2$  on heating.
- 159 **(d)**  
 Due to H-bonding  
 $\text{K}^+\text{F}^- + \text{HF} \rightarrow \text{K}^+[\text{F} \cdots \text{H} - \text{F}]^-$  or  $\text{K}^+[\text{HF}_2]^-$
- 160 **(b)**  
 Microcosmic salt is  $\text{Na}(\text{NH}_4)\text{HPO}_4$ . It is white crystalline solid. It is obtained when  $\text{NH}_4\text{Cl}$  and  $\text{Na}_2\text{HPO}_4$  are dissolved in hot water and cooled.
- $$\text{NH}_4\text{Cl} + \text{Na}_2\text{HPO}_4 \rightarrow \text{Na}(\text{NH}_4)\text{HPO}_4 + \text{NaCl}$$
- It is separated by fractional crystallisation. It is used for the detection of certain basic radicals which forms coloured mixed phosphate with  $\text{NaPO}_3$ .
- $$\text{Na}(\text{NH}_4)\text{HPO}_4 \xrightarrow{\Delta} \text{NaPO}_3 + \text{NH}_3 + \text{H}_2\text{O}$$
- $$\text{NaPO}_3 + \text{CoO} \rightarrow \text{NaCo} \cdot \text{PO}_4$$
- blue bead
- 161 **(b)**  
 Li forms  $\text{Li}_2\text{O}$ , Na forms  $\text{Na}_2\text{O}_2$  and rest all alkali



186 (d)

On hydration plaster of Paris, converts into gypsum.



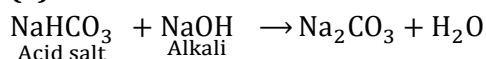
187 (b)

The stability of carbonates of alkaline earth metals increases down the group due to increasing electropositive character of metals.

188 (b)

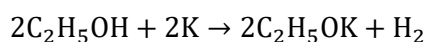
Francium (at. No. 87) is radioactive. Sodium isotopes are also radioactive ( $N^{24}$ ).

189 (a)

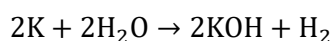


190 (b)

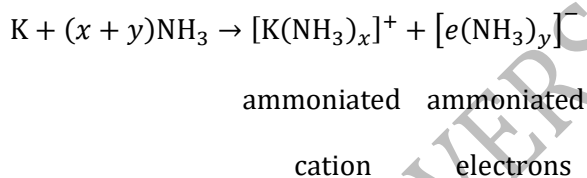
Alkali metals are highly reactive metals. They react with alcohol as



With water as



With ammonia as



191 (a)

Only Li forms monoxide:  $4\text{Li} + \text{O}_2 \rightarrow 2\text{Li}_2\text{O}$ .

192 (a)

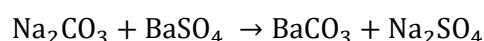
$\text{MgCl}_2$  is hygroscopic.

193 (b)

It is calcium cyanamide used under the name nitrolime.

194 (a)

On fusion of  $\text{Na}_2\text{CO}_3$  and  $\text{BaSO}_4$  barium carbonate is obtained



195 (b)

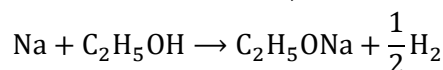
According to Fajan's rule, smaller is cation and larger is anion then more is covalent nature.

197 (d)

$\text{Al}(\text{OH})_3$  is soluble in  $\text{NaOH}(\text{aq.})$  whereas  $\text{Fe}(\text{OH})_3$  is insoluble.

199 (c)

Na reacts with alcohol;



200 (b)

$\text{Li}^+$  has  $1s^2$  configuration, i. e., nearest noble gas configuration.

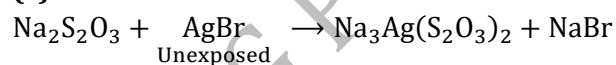
201 (b)

$\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$  (Hypo). It is called photographer's fixer because it removes the excess  $\text{AgBr}$  in the form of soluble silver complex.

202 (c)

For an ionic compound to be soluble in water its hydration energy should be more than its lattice energy.

203 (c)



The property is used for fixing in photography.

204 (d)

$\text{Na}_2\text{S}_2\text{O}_3$  reacts with  $\text{AgBr}$  (photography) and with  $\text{I}_2$  (iodometric and iodimetric titrations).

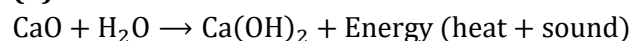
205 (b)

Magnesium sulphate heptahydrate [ $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ] is called epsom salt.

206 (d)

It is a reason for given fact.

207 (b)



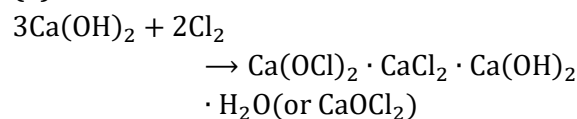
208 (d)

Sodium sulphate decahydrate ( $\text{Na}_2\text{SO}_4 \cdot 10 \text{H}_2\text{O}$ ) is also known as Glauber's salt.

209 (a)

Dead burnt is  $\text{CaSO}_4$ .

210 (a)



211 (a)

Baking soda is sodium bicarbonate.

212 (b)

Na is basic in nature and forms basic oxides.

213 (d)

$\text{NaCl}$  as deposits on sea shores.

214 (d)

Ba and Ra on burning in air forms peroxides ( $\text{MO}_2$ ). Rest all give oxides ( $\text{MO}$ ).

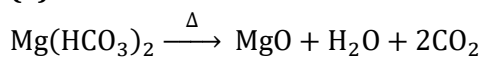
215 (b)

Due to anodic reaction as:  $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2e$ .

216 (c)

It is a fact.

217 (a)

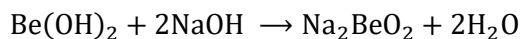
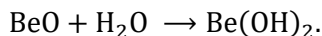


aqueous solution of (products)

magnesium bicarbonate

218 (a)

Metal *M* is Be.



Soluble

219 (a)

All metals show metallic bonding involving oscillation of electrons in them and thus, are good conductor of heat and electricity.

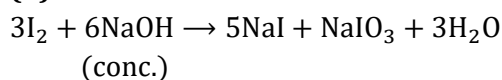
221 (c)

Rest all involve use of  $\text{Na}_2\text{CO}_3$ .

222 (d)

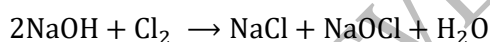
It is a reason for given fact.

223 (b)



224 (c)

$\text{NaOCl}$  is used as a bleaching agent and sterilising agent. It is formed by the action of  $\text{Cl}_2$  with cold and dilute  $\text{NaOH}$ .



Cold and dil.



Hot and conc.

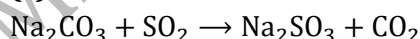
225 (d)

$\text{CaC}_2\text{O}_4$  is insoluble in acetic acid.

226 (b)



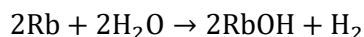
227 (c)



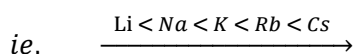
228 (d)

Jump in IP is noticed during the change of shell.

229 (b)

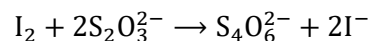


As we go down the group reactivity with  $\text{H}_2\text{O}$  increases



231 (a)

Thiosulphate ( $\text{S}_2\text{O}_3^{2-}$ ) is oxidised to tetrathionate ( $\text{S}_4\text{O}_6^{2-}$ ) ion by iodine.



232 (b)

$\text{NaOH} + \text{CaO}$  is called soda lime. 3 : 1

233 (a)

It is a fact and lithopone is used as paint.

234 (a)

$\text{LiCl}$  is covalent in nature and thus, soluble inorganic solvents.

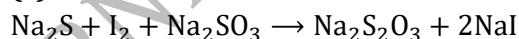
235 (d)

Ca - brick red colour

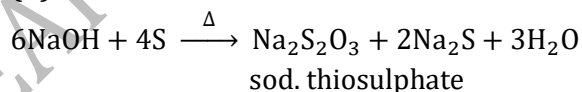
Sr - crimson red

Ba - green.

236 (c)

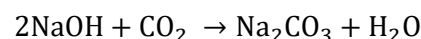
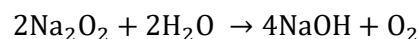


237 (d)



238 (d)

Sodium peroxide reacts with moisture and  $\text{CO}_2$  of air (when exposed to air) and becomes white due to the formation of  $\text{NaOH}$  and  $\text{Na}_2\text{CO}_3$ .



239 (c)

It is a fact.

240 (b)

$\text{Al}^{3+}$  is very good coagulant for negatively charged dispersions in water.

241 (d)

Bones contain  $\text{Ca}_3(\text{PO}_4)_2$ .

242 (c)

It is a fact.

243 (b)

It is a reason for given fact.

244 (d)

It is a fact.

245 (a)

Alkali metals' family has closest resemblances in its members.

246 (c)

Lithium and magnesium shows diagonal

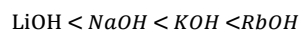
relationship. Some points of similarity are  
(i) Polarising power of  $\text{Li}^+$  and  $\text{Mg}^+$  are almost same.

(ii) Like Li, Mg decomposes water very slowly.

(iii)  $\text{LiCl}$  and  $\text{MgCl}_2$  are deliquescent.

(iv) Like Li, Mg do not form solid bicarbonates.

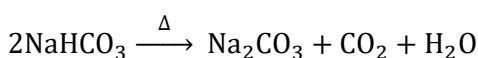
247 (c)



Down the group basic character increases

248 (c)

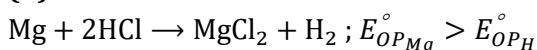
Sodium bicarbonate decomposes on strong heating and gives sodium carbonate.



249 (a)

Fusion mixture contains  $\text{K}_2\text{CO}_3$  and  $\text{Na}_2\text{CO}_3$ .

250 (d)

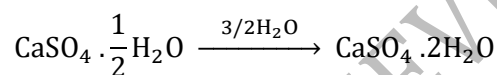


251 (a)

Baking powder contains  $\text{NaHCO}_3$ ,  $\text{Ca}(\text{H}_2\text{PO}_2)_2$  and starch.

252 (d)

Plaster of Paris absorb water to form monoclinic gypsum which is a hard substance.



monoclinic gypsum

253 (a)

Li and Mg show diagonal relationship.

254 (d)

It is a fact.

255 (c)

$\therefore$  Carbon dioxide does not help in burning and it reacts with alkali metals to form carbonates.

$\therefore$   $\text{CO}_2$  is used to extinguish fire of lithium, sodium and potassium.

256 (d)

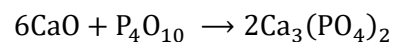
Halides of alkaline earth metals possess all these properties.

257 (c)

Le blanc method is for the manufacture of  $\text{Na}_2\text{CO}_3$ .

258 (b)

Thomas slag is  $\text{Ca}_3(\text{PO}_4)_2$ . It is used as a fertilizer. It has 14-18% of  $\text{P}_2\text{O}_5$ .



phosphatic slag

or Thomas slag

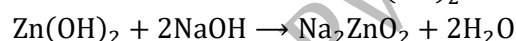
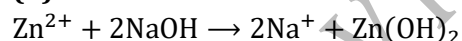
259 (c)

Norwegian saltpetre is basic calcium nitrate.

260 (a)

Alkali and alkaline earth metals are extracted by the electrolysis of their fused salt.

261 (b)



Thus,  $\text{Na}_2\text{ZnO}_2$  forms  $2\text{Na}^+$  and  $[\text{ZnO}_2]^{2-}$  ions.

262 (d)

From the given compounds, only  $\text{CaCl}_2$  is used to preserve wood.  $\text{NaCl}$ , however is also a preservative but not for wood.

263 (b)

$\text{CO}_2$  is an acidic oxide and thus, reacts with  $\text{Ba}(\text{OH})_2$  to give insoluble  $\text{BaCO}_3$ .

264 (a)

It is a reason for given fact.

265 (a)

Carnallite is  $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$

266 (a)

The density of alkali metal is as :

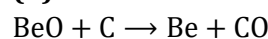
Element : Li Na K Rb Cs

Density : 0.53 0.97 0.68 1.53 1.90

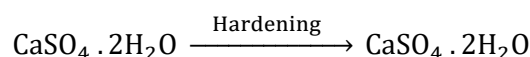
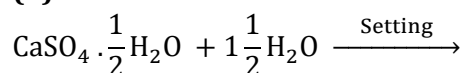
Hence, the order of increasing density is as



267 (b)



268 (b)



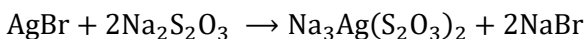
269 (c)

The stability of hydroxides of first group elements increases down the group.

270 (a)

The solubility of silver bromide in hypo solution

due to the formation of  $\text{Na}_3\text{Ag}(\text{S}_2\text{O}_3)_2$ .



Sod. argentothiosulphate

(colourless)

271 (b)

The abundance ratio is  $\text{Na} > \text{K} > \text{Li} > \text{Cs} > \text{Fr}$

272 (c)

It is a reason for given fact.

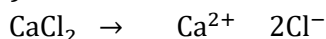
273 (a)

Fluorspar ( $\text{CaF}_2$ ) is an ore of calcium.

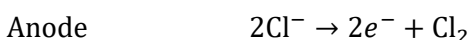
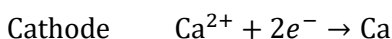
274 (c)

Alkali metal compounds are more ionic and soluble in water.

275 (a)



(molten) cathode anode



276 (b)

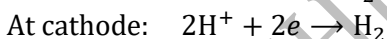
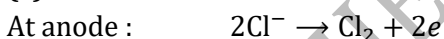
$\text{Na}^+$  is preferentially discharged on Hg electrode.

277 (b)

$\text{Li}^+$  is having largest hydrated ionic size while  $\text{Rb}^+$  is having smallest.

Smaller the size, greater the mobility.

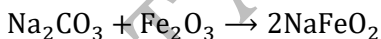
278 (c)



279 (a)

The m.p. of  $\text{NaCl}$  is lowered on addition of  $\text{KCl}$ .

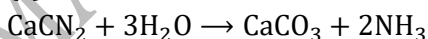
280 (a)



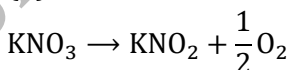
281 (a)

Blanc fixe is finely divided  $\text{BaSO}_4$ .

282 (c)



283 (b)



Rest all give  $\text{NO}_2$

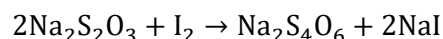
284 (b)

Cationic radius increases down the group and decreases along the period.

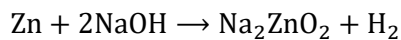
285 (a)

Standard solution of iodine is used to estimate

$\text{Na}_2\text{S}_2\text{O}_3$  (hypo) solution. It is oxidised to sodium tetrathionate by iodine.



286 (b)



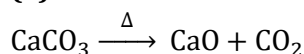
287 (d)

It is chemical formula of hypo.

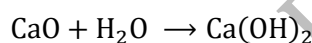
288 (b)

Abundance ratio is  $\text{Ca} > \text{Mg} > \text{Be} > \text{Sr} \sim \text{Ba} > \text{Ra}$ .

289 (a)



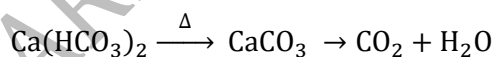
(X)



(Y)



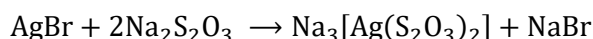
(Z)



(X)

290 (c)

When sodium thiosulphate solution is added to  $\text{AgBr}$ , then sodium argentothiosulphate is obtained.



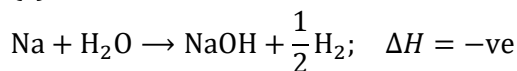
(colourless)

sodium argentothiosulphate

291 (c)

It is a fact

292 (c)

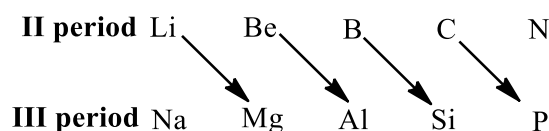


293 (c)

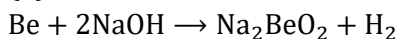
$\text{NaF}$  possesses most ionic character.

294 (d)

The elements of II<sup>nd</sup> period show similar properties as the elements of III<sup>rd</sup> period which are diagonally placed to them.



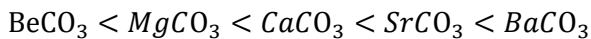
295 (a)



296 (b)

In II-A group, the stability of carbonates increase with the rise in atomic number due to small size of the resulting oxide ion.

*i.e.*,



297 (c)

Aqueous solution of baryta (BaO) is called baryta water, *i. e.*,  $\text{Ba}(\text{OH})_2$ .

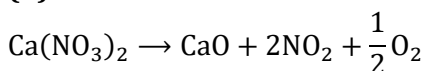
298 (c)

$\text{Ba}^{2+}$  forms insoluble  $\text{BaSO}_4$ ,  $\text{Pb}^{2+}$  forms  $\text{PbCl}_2$  and  $\text{PbSO}_4$  both insoluble in cold water.

299 (c)

Na	K	Ba	Ca
yellow crimson	pale violet	apple green	brick red

300 (d)



Ca imparts brick red colour to flame.

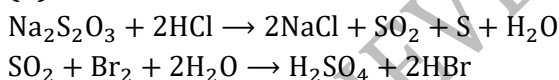
301 (c)



302 (a)

Li is much softer than the other group first metals. Actually, Li is harder than other alkali metals

303 (d)



304 (d)

Magnesium (Mg) cannot be obtained by the electrolysis of its aqueous salt solution because when it is liberated at cathode, at once reacts with  $\text{H}_2\text{O}$  to give metal hydroxide and hydrogen.

305 (a)

Follow Fajan's rule.

306 (d)

It is a fact.

307 (d)

Hg covers surface of sodium to an extent and thus, surface area available for reaction decreases.

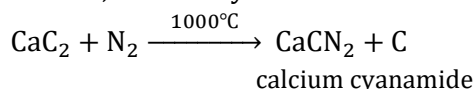
308 (a)

On moving down the second group the thermal stability of alkaline earth metal carbonates increases.

Hence,  $\text{MgCO}_3$ , being the carbonate of upper element, decomposes at lowest temperature.

309 (b)

When calcium carbide reacts with nitrogen at  $1000^\circ\text{C}$ , calcium cyanamide and carbon is formed.



310 (b)

Grignard reagents are  $\text{RMgX}$ .

311 (a)

Alkali metals have low ionisation energy. They possess minimum value of ionisation energy in their period.

312 (c)

Violet colour to flame is characteristic of potassium. Also aqueous solution of  $\text{K}_2\text{CO}_3$  is alkaline.

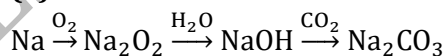
313 (b)

$\text{LiF}$  has smallest cation and smallest anion. Thus, coulombic forces are strongest.

314 (d)

The order of the size of hydrated ions of I group metals is,  
 $\text{Li}^+(\text{aq.}) > \text{Na}^+(\text{aq.}) > \text{K}^+(\text{aq.}) > \text{Rb}^+(\text{aq.}) > \text{Cs}^+(\text{aq.} \dots \dots \dots)$

315 (a)



316 (c)

$\text{BaSO}_4$  is insoluble in  $\text{NH}_3$  and hot water.

317 (b)

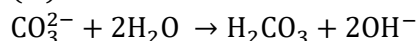
(i) The alkali metal superoxides contain  $\text{O}_2^-$  ion, which has an unpaired electron, hence they are paramagnetic in nature.

(ii) The basic character of alkali metal hydroxides increases on moving down the group.

(iii) The conductivity of alkali metal chlorides in their aqueous solution increases on moving down the group because in aqueous solution alkali metal chlorides ionize to give alkali metal ions.

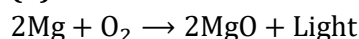
On moving down the group the size of alkali metal ion increases, thus degree of hydration decreases, due to this reason their conductivity in aqueous solution increases on moving down the group.

(iv) DIAGRAM



Thus, basic nature of carbonates in aqueous solution is due to anionic hydrolysis.

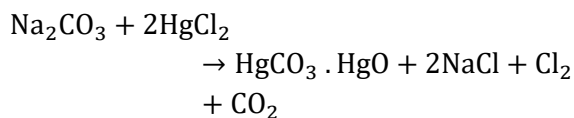
318 (b)



319 (b)

Basic mercuric carbonate is obtained in this

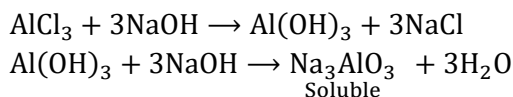
reaction.



320 (a)

A suspension of  $\text{Mg}(\text{OH})_2$  in water is used as antacid under the name of milk of magnesia.

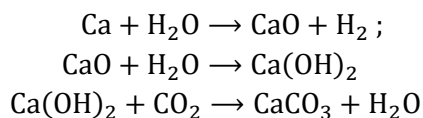
321 (c)



322 (b)

Sodium thiosulphate ( $\text{Na}_2\text{S}_2\text{O}_3$ ) is useful in photography due to its complex formation property. It is used in photography as a fixer since, it dissolves unexposed silver bromide.

323 (c)



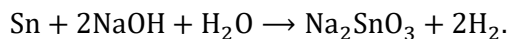
324 (a)

$\text{MgO}$  is basic; rest all are amphoteric.

325 (b)

Epsom salt is used as purgative.

326 (c)



327 (b)

Alkali metals have  $ns^1$  configuration.

328 (a)

It is an use of  $\text{Mg}$ .

329 (a)

$\text{Ni}(\text{OH})_2$  is green insoluble mass in alkaline medium.

330 (d)

$\text{Mg}$  due to lightness and toughness is used in ships.

332 (a)

For an ionic compound if lattice energy < its hydration energy, it is water soluble.

333 (b)

$\text{NaCl}$  has fcc structure.

334 (a)

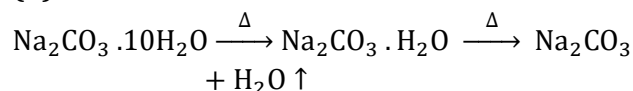
$\text{Na}_2\text{CO}_3$  will not decompose on heating.

All alkali metal (IA group) carbonates (except  $\text{Li}_2\text{CO}_3$ ) are highly stable and not decomposes on heating. Carbonates of alkaline earth metals (II A group) decompose into  $\text{CO}_2$  and metal oxide.

335 (b)

Both have 18 electrons.

336 (d)



337 (c)

Anhydrous  $\text{CaCl}_2$  is used for fast drying of neutral gases.

339 (c)

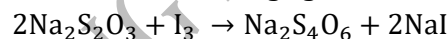
It is a fact.

340 (d)

Anhydrous calcium chloride is used in the laboratory for fast drying of neutral gases

341 (a)

The presence of excess of sulphur makes sodium thiosulphate a useful reducing agent.



This reaction is applied in volumetric estimation of iodine. In this reaction sodium thiosulphate acts as a reducing agent.

342 (b)

The alkaline earth metal salts do not contain unpaired electrons.

343 (c)

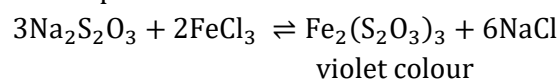
Molten  $\text{NaCl}$  has  $\text{Na}^+$  and  $\text{Cl}^-$  ions.

344 (a)

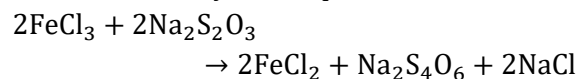
$\text{Ag}$  and  $\text{Hg}$  oxides decompose on heating.

345 (c)

When a few drops of  $\text{FeCl}_3$  solution is added to hypo solution, a violet colour of ferric thiosulphate is obtained.



This colour disappears quickly due to reduction of ferric chloride by thiosulphate.

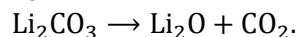


346 (d)

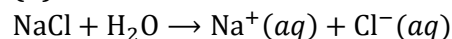
High blood pressure is developed if  $\text{Na}^+$  becomes more in human blood.

347 (a)

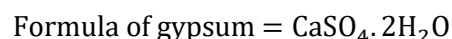
$\text{Li}_2\text{CO}_3$  decomposes on heating:



348 (d)



349 (d)

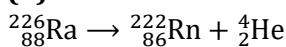




Difference of water molecule =  $2\text{H}_2\text{O} - \frac{1}{2}\text{H}_2\text{O}$

$$= 1\frac{1}{2}\text{H}_2\text{O}$$

350 (b)



351 (a)

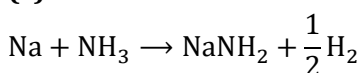
Effective nuclear charge (ENC) of  $\text{K}^+ >$  ENC of  $\text{Cl}^-$  and thus, shells are pulled more effectively in  $\text{K}^+$  ion.

352 (a)

The lattice energy of alkali metal halides decreases down the group due to increase in size of alkali metals. Thus,

LiCl	NaCl	KCl	RbCl	CsCl
883°C	808°C	772°C	717°C	645°C

353 (c)



354 (a)

Alkali metals are strongest reducing agent among elements of Periodic Table. The reducing character decreases down the group.

∴ Li is strongest reducing agent among Li, Na, Mg and Ca.

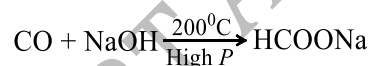
355 (d)

Due to small size of  $\text{Na}^+$ , it is heavily hydrated and become large molecule.

Ionic conductance increases down the group in alkali metals. Order of ionic conductance



356 (c)



The only reaction in which carbon monoxide (a neutral oxide of carbon) acts as an acid.

357 (b)

Be and Mg salts possess covalent nature.

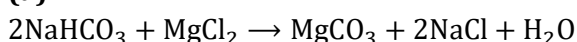
358 (c)

Beryl is an ore of Be, *i. e.*, ( $\text{BeO}$ ).

360 (d)

These are various names for NaCl.

362 (a)



363 (c)

$\text{K}_2\text{O}$  is pot. Oxide;  $\text{K}_2\text{O}_2$  is pot. Peroxide;  $\text{KO}_3$  is ozonide.

364 (a)

It is reason for the given fact.

365 (d)

Follow text.

366 (a)

$\text{CaCl}_2$  is hygroscopic in nature.

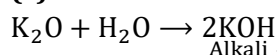
367 (a)

KI reacts with  $\text{Pb}^{2+}$ ,  $\text{Hg}^{2+}$  and  $\text{Cu}^{2+}$  to give insoluble iodides of Pb, Hg and Cu.

368 (c)

Both Be and Al are rendered passive due to the formation of inert, insoluble and impervious oxide layer on their surface.

370 (c)

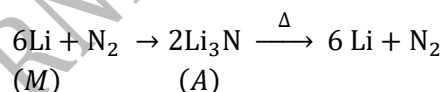


371 (c)

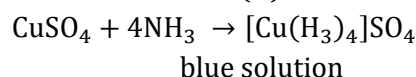
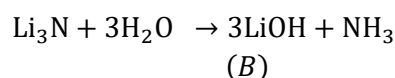
Mg is found in sea water.

372 (b)

The formula of 'A' is  $\text{M}_3\text{N}$ . It suggests that M is a monovalent metal.



lithium nitride



Hence, M and B are Li and  $\text{NH}_3$  respectively.

373 (b)

Salts of calcium are used in the form of manure *e.g.*, triple superphosphate of lime [ $\text{Ca}(\text{H}_2\text{PO}_4)_2 \cdot \text{H}_2\text{O}$ ].

374 (b)

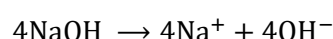
Mixture of  $\text{MgCl}_2$  and  $\text{MgO}$  is called Sorel's cement. It is  $\text{MgCl}_2 \cdot 5\text{MgO} \cdot x\text{H}_2\text{O}$ .

375 (a)

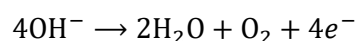
The electropositive character increase down the gp. and decreases along the period.

376 (c)

In Castner process the process of extracting sodium metal can be written as,



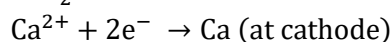
Its oxidation reaction which occurs at anode is



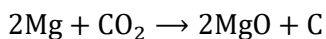
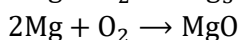
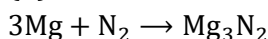
377 (a)

Calcium is manufactured by the electrolysis of a

molten mixture of calcium chloride containing some  $\text{CaF}_2$ .



378 (d)



379 (d)

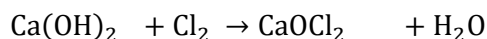
Baking soda is  $\text{NaHCO}_3$ .

380 (a)

The basic character of oxides decreases along the period.

381 (b)

Bleaching powder is obtained by treating chlorine with slaked lime.



Slaked lime                  bleaching powder

382 (c)

Siedlitz powder contains  $\text{NaHCO}_3$ .

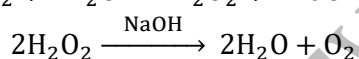
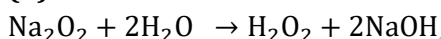
383 (d)

$\text{NaHCO}_3$  is manufactured as byproduct in Solvay process for  $\text{Na}_2\text{CO}_3$ .

384 (c)

It is a reason for given fact.

385 (b)



Water used during the reaction reacts with  $\text{Na}_2\text{O}_2$  to form  $\text{NaOH}$  which tends to decompose  $\text{H}_2\text{O}_2$ .

386 (a)

A characteristics of alkali metals.

387 (a)

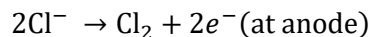
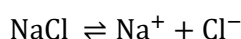
It is a reason for given fact.

388 (b)

When  $\text{CO}_2$  gas is passed through a brine solution (28%  $\text{NaCl}$ ) saturated with ammonia, it gives sodium bicarbonate which on drying and heating gives sodium carbonate.

389 (c)

In Down process, sodium is manufactured by the electrolysis of fused sodium chloride in the presence of  $\text{CaCl}_2$  and  $\text{KF}$  using graphite anode and iron cathode.



$\text{CaCl}_2 + \text{KF}$  lower the melting point from the 1085 K to 850 K.

390 (d)

From Be to Ba ionic character increases

391 (a)

Mg combines directly with  $\text{N}_2$ .

392 (d)

It is a fact.

393 (c)

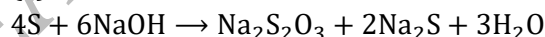
On moving down the group, lattice energy remains almost constant as the sulphate is so big that small increase in size of the cations does not make difference. Hydration energy causes decrease in the solubility of the sulphates as the ionic size increases. Thus, the correct order is



394 (b)

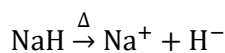
It is a reason for given fact.

396 (c)



398 (a)

On fusion ions are separated from each other.



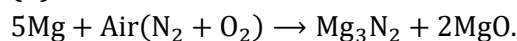
399 (a)

Plaster of Paris  $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ , gypsum  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ .

400 (d)

Mg alloys are lighter.

401 (d)

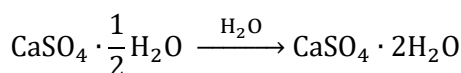


402 (c)

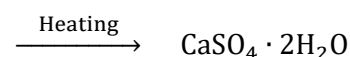
The effective nuclear charge order  $\text{K}^+ > \text{Ca}^+ > \text{Ba}^+$ .

403 (d)

Setting of plaster of Paris is exothermic process



orthorhombic



mono

orthorhombic

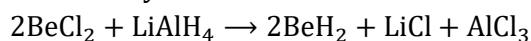
gypsum

404 (d)

When carbonates are heated, they decompose to form the oxide. Sodium carbonate and potassium carbonate do not decompose. The carbonate become more difficult to decompose as we go down the 1st group

405 (b)

Hydrides of alkaline earth metals (except Be) are obtained by heating them in hydrogen.  $\text{BeH}_2$  is obtained by



407 (b)

The basic character of metal oxides and hydroxides decreases along the period and increases down the gp.

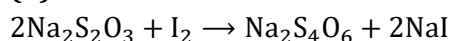
408 (d)

Cd does not react with NaOH.

409 (b)

$E_{OP}^\circ$  of Mg >  $E_{OP}^\circ$  of Cu.

410 (d)

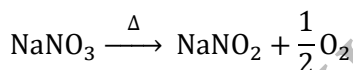
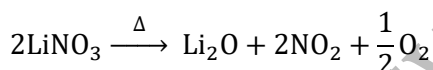


411 (d)

These are uses of Mg.

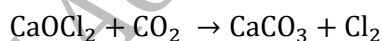
412 (b)

$\text{LiNO}_3$  behaves differently from other alkali metal nitrates.



413 (c)

Bleaching action of bleaching powder is due to  $\text{Cl}_2$ , it liberate with dilute acids or even  $\text{CO}_2$ .



414 (d)

Alkaline earth metals combine directly with  $\text{O}_2$  to form oxides which when further heated in presence of excess of  $\text{O}_2$  form peroxides. Thus,  $\text{BaO}$  is formed

416 (a)

$\text{CaO} + \text{CO}_2 \rightarrow \text{CaCO}_3$ ;  $\text{CO}_2$  does not react with  $\text{NaHCO}_3$ .

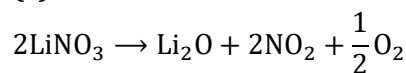
417 (c)

The solubility of hydroxides of alkaline earth metals in water increases on moving down the group

418 (c)

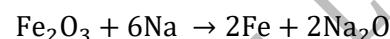
The complex forming tendency is more in  $\text{Li}^+$  due to its small size. The tendency of complex formation decreases as the size increases.

419 (c)



420 (b)

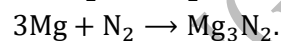
Alkali metals have only one electron in their ultimate shell, hence they can easily donate electron and act as reductant *e.g.*,



421 (c)

Carnallite is  $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ .

423 (d)



424 (c)



426 (b)



427 (b)

$\text{BeSO}_4$  is soluble in water.

428 (b)

In rest all NaOH is used.

429 (c)

Cement is mixture of Ca and Al silicates. It has some  $\text{Fe}_2\text{O}_3$  also. It does not have sulphur.

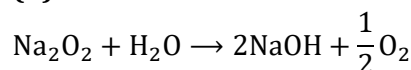
430 (a)

$\text{KOH(aq.)}$  is potash lye;  $\text{NaOH(aq.)}$  is soda lye; anhydrous  $\text{Na}_2\text{SO}_4$  is salt cake.

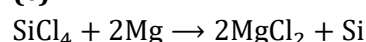
431 (b)

Ionization enthalpy decreases down the group.

432 (d)



433 (c)



434 (a)

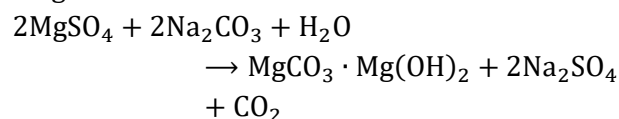
Except  $\text{Be}_3\text{N}_2$ , rest all are non-volatile nitrides.

435 (a)

$\text{LiHCO}_3$  is not stable in solid state.

436 (d)

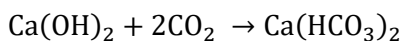
$\text{Na}_2\text{CO}_3$  reacts with  $\text{MgSO}_4$  to give basic magnesium carbonate.



437 (b)

- BaCrO<sub>4</sub> is yellow solid, insoluble in CH<sub>3</sub>COOH.
- 438 (b) K is used as fertilizer (NPK) for nutrition of plants.
- 439 (b) (a) Na<sub>2</sub>CO<sub>3</sub> · 10H<sub>2</sub>O – Washing soda or sol soda.  
(b) Na<sub>2</sub>SO<sub>4</sub> · 10 H<sub>2</sub>O – Glauber's salt.  
(c) MgSO<sub>4</sub> · 7 H<sub>2</sub>O – Epsom salt
- 440 (b)  
$$\text{ZnSO}_4 + 2\text{NaOH} \rightarrow \underset{\text{ppt.}}{\text{Zn(OH)}_2} + \text{Na}_2\text{SO}_4$$
  
$$\text{Zn(OH)}_2 + 2\text{NaOH} \rightarrow \underset{\text{soluble}}{\text{Na}_2\text{ZnO}_2} + 2\text{H}_2\text{O}$$
- 442 (c) Due to efflorescence (to give out H<sub>2</sub>O) nature of Na<sub>2</sub>CO<sub>3</sub> · 10H<sub>2</sub>O.
- 443 (a) Fe(OH)<sub>3</sub> is not soluble in NaOH  
(b)  $\text{Zn(OH)}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{ZnO}_2 + 2\text{H}_2\text{O}$   
sod. Zincate  
(soluble)  
(c)  $\text{Al(OH)}_3 + \text{NaOH} \rightarrow \text{NaAlO}_2 + 2\text{H}_2\text{O}$   
sod. aluminate  
(soluble)  
(d)  $\text{Sn(OH)}_2 + \text{NaOH} \rightarrow \text{Na}_2\text{SnO}_2 + 2\text{H}_2\text{O}$   
sod. stannate  
(soluble)
- 444 (b)  
$$\text{MgCO}_3 \xrightarrow{\text{Heat}} \text{MgO} + \text{CO}_2$$
  
The metal oxide of which is stable, has unstable carbonate
- 445 (b) Due to the presence of Sr, the bombs becomes dark red in colour
- 446 (d) Be forms polymeric hydride.
- 447 (d) Hypo or sodium thiosulphate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) is used in the fixing of image. It dissolves unaffected AgBr but leaves metallic silver unchanged.  
$$2\text{Na}_2\text{S}_2\text{O}_3 + \text{AgBr} \rightarrow \text{Na}_3[\text{Ag(S}_2\text{O}_3)_2] + \text{NaBr}$$
  
Hypo soluble

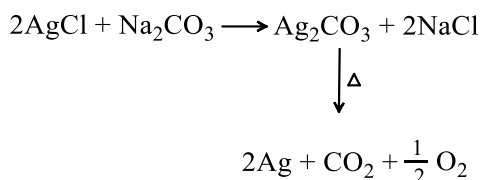
- 448 (d) Alkali metal hydroxides are more stronger base than alkaline earth metal hydroxides. Also basic character of hydroxides of alkaline earth metals increase down the gp.
- 449 (a) BeCl<sub>2</sub> is covalent in nature.
- 451 (d) Because of the smaller size of F-ions, NaF has the highest lattice energy and hence, the highest melting point
- 452 (a) The chemical formula of feldspar is KAlSi<sub>3</sub>O<sub>8</sub>.
- 453 (a) Formation of Li<sup>+</sup> (M<sup>+</sup>) ion is the property of first group elements, i.e., alkali metals, not that of second group elements.
- 454 (c) Higher heat of hydration for Li<sup>+</sup> shows more negative  $\Delta H$  for the reaction,  
$$\text{Li(s)} + \text{Aq.} \rightarrow \text{Li}^+(\text{aq.}); \Delta H = HS + IE - H_h$$
- 455 (d) The members of II and III period in periodic table are referred as representative elements.
- 456 (a) The basic character of oxides increases down the gp.
- 457 (c)  $\text{NaCl} + \text{NH}_4\text{OH} + \text{CO}_2 \rightarrow \text{NaHCO}_3 + \text{NH}_4\text{Cl}$
- 458 (c) It is sodium ammonium hydrogen phosphate.
- 459 (c) The thermal stability of hydrides decreases from LiH to CsH.
- 460 (c) Mg<sup>2+</sup> is smallest cation; Cl<sup>-</sup> is larger than F<sup>-</sup>.
- 461 (c) 
$$\text{Ca(OH)}_2 + \text{Ca(HCO}_3)_2 \rightarrow 2\text{CaCO}_3 \downarrow + 2\text{H}_2\text{O}$$
  
(A)  
Temporary hardness of water is removed by Ca(OH)<sub>2</sub>. It converts bicarbonates into insoluble calcium and magnesium carbonate which are removed by filtration.
- $$\text{Ca(OH)}_2 + \text{Na}_2\text{CO}_3 \rightarrow \text{CaCO}_3 + 2\text{NaOH}$$
  
A sodium carbonate caustic soda



(A) calcium bicarbonate  
(cloudy)

462 (c)

As salt on heating gives Ag,



463 (a)

Be being smallest alkaline earth metal have highest charge size ratio and thus, forms complex salts, e.g.,  $[\text{BeF}_3]^-$ ,  $[\text{BeF}_4]^{2-}$

464 (b)

The electropositive character increases down the group; (a) and (b) are 1 group elements.

465 (c)

In Le-blanc process, potassium chloride of carnallite is converted to  $\text{K}_2\text{SO}_4$  which is then heated with coal and lime stone to give  $\text{K}_2\text{CO}_3$ . (Potash or pearl ash)

466 (c)

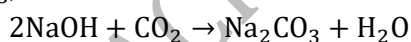
It is a method to precipitate  $\text{Mg}^{2+}$  ion in VI gp, of qualitative analysis.

467 (a)

For an ionic compound to be soluble in water its hydration energy should be more than its lattice energy.

468 (c)

$\text{NaOH}$  absorbs moisture and  $\text{CO}_2$  from air to form  $\text{Na}_2\text{CO}_3$ ;



469 (d)

The solubility order:  $\text{CaF}_2 < \text{CaCl}_2 < \text{CaBr}_2 < \text{CaI}_2$ .

470 (a)

Li does not form double salts.

471 (b)

It is a fact.

472 (b)

The standard oxidation potential increases from Be to Ba, hence their reducing property also increases from Be to Ba.

473 (d)

$\text{Na}_2\text{S}_4\text{O}_6$  is sodium tetrathionate.

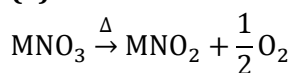
474 (a)

Egg-shells are made up of  $\text{CaCO}_3$ .

475 (a)

The hydroxides of alkali and alkaline earth metals are strong bases. Thus,  $\text{Zn(OH)}_2$  is the weakest base

476 (a)



477 (b)

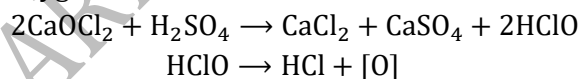
Li has highest ionisation enthalpy and use larger energy of flame and thus emits red light (longer wave length).

478 (b)

Solubilities of carbonates decrease down the group because lattice energy decrease is almost constant while decrease in hydration energy downs sharply, finally difference of hydration energy and lattice energy decrease thus solubility decreases.

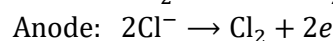
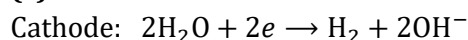
479 (c)

In presence of dil. acids, bleaching powder loses oxygen.



This oxygen is used for oxidation-bleaching.

480 (c)



481 (d)

Due to small size and almost same charge mass ratio.

482 (b)

Oxone is  $\text{Na}_2\text{O}_2$  + dil. HCl, used for bleaching of delicate fibres.

483 (b)

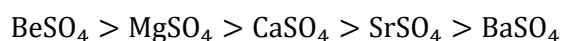
Witherite is  $\text{BaSO}_3$ .

484 (a)

$\text{PbCl}_2$  is insoluble in cold water.  $\text{Mg}^{2+}$  and  $\text{Pb}^{2+}$  do not show flame colour.

485 (a)

$\text{BeSO}_4$  is most soluble because hydration energy is more than lattice energy



Hydration energy decreases, hence solubility decreases

486 (b)

Li-Mg shows diagonal relationship due to this fact.

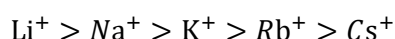
487 (b)

Solvay process is used for the manufacture of

Na<sub>2</sub>CO<sub>3</sub>.

488 (a)

All alkali metal salts are soluble in water. The degree of hydration depends upon the size of the cation. Smaller the size of cation, greater is its charge density and hence, greater is its tendency to withdraw electrons from molecules which are thus polarised. Li<sup>+</sup> ion being smallest in size among alkali metal ions is the most extensively hydrated while Cs<sup>+</sup> ion the largest alkali metal ion is the least hydrated. The size of hydrated alkali ions is as



(Relative ionic radii in water)

(Relative degree of hydration)

489 (d)

The stability and basic character of hydrides decreases down the group.

490 (c)

Ra is radioactive and thus, decays instantaneously.

491 (a)

Atomic volume increases down the group.

492 (c)

Mme Curie and her husband Piere Curie isolated radium from pitch blende.

493 (c)

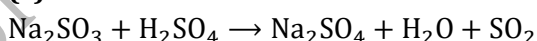
The basic character of metal oxides and hydroxides decreases along the period and increases down the gp

494 (c)

Greater the electropositive character, more will be stability and high decomposition temperature.

∴ Among given choices barium has highest electropositive character and hence, highest decomposition temperature.

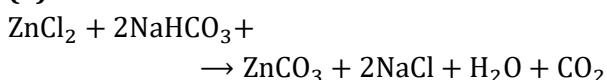
495 (c)



496 (a)

Gun powder is an explosive mixture containing KNO<sub>3</sub> + Charcoal + S

498 (a)

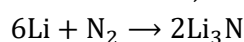


499 (a)

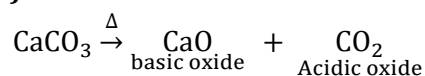
P<sup>3-</sup> ions are phosphide ion.

500 (a)

Only Li combines directly with nitrogen to form lithium nitride,



502 (b)



503 (d)

Sorel's cement - MgCl<sub>2</sub> · 5MgO · xH<sub>2</sub>O.

504 (a)

When KI is added to acidified solution of sodium nitrite NO gas is liberated and I<sub>2</sub> is set free.



505 (a)

Baryta is BaO.

506 (c)

∴ NaHCO<sub>3</sub> is more soluble than Na<sub>2</sub>CO<sub>3</sub> in water.

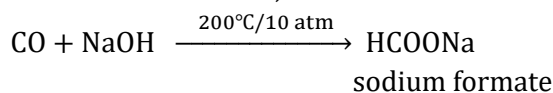
∴ Na<sub>2</sub>CO<sub>3</sub> cannot exist in water along with NaHCO<sub>3</sub>.

507 (b)

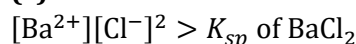
CaCl<sub>2</sub> is used as desiccating agent.

508 (c)

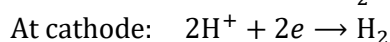
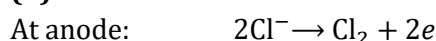
When carbon monoxide is passed over solid caustic soda at 200°C, sodium formate is obtained.



509 (c)

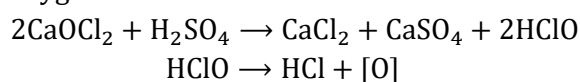


510 (b)



511 (a)

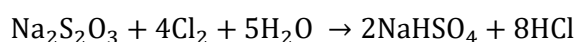
In presence of dil. Acids, bleaching powder loses oxygen.



This oxygen is used for oxidation—bleaching.

512 (b)

Sodium thiosulphate, Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> gets oxidised by chlorine water.



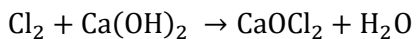
513 (d)

Washing soda is chemically Na<sub>2</sub>CO<sub>3</sub> · 10H<sub>2</sub>O.

514 (d)

Mg is present in chlorophyll.

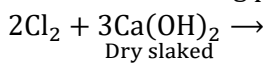
515 (a)



Compound 'X' is dry slaked lime.

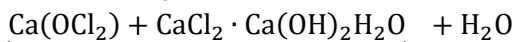
516 (d)

Hasenclever plant (old method), Beckmann's plant (new method) are the commercial method to obtain bleaching powder by:



Dry slaked

lime



Bleaching powder

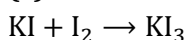
517 (c)

K reacts with HCl violently.

518 (b)

Alkali metal hydroxide are highly soluble in water.

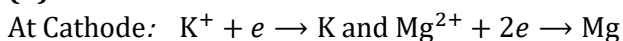
519 (c)



520 (a)

Be ( $Z = 4$ ) has maximum covalency of 4 while Al ( $Z = 13$ ) has maximum covalency of 6.

521 (d)

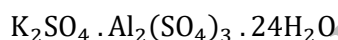


522 (b)

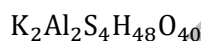
Only Ca in given choices reacts with water to give  $\text{H}_2$ .

523 (c)

The composition of potash alum is



or



It is a double salt of potassium sulphate and aluminium sulphat.

524 (c)

Dolomite is  $\text{CaCO}_3 \cdot \text{MgCO}_3$ .

525 (b)

Crystal carbonate is monohydrate of  $\text{Na}_2\text{CO}_3$ , i. e.,  $\text{Na}_2\text{CO}_3\text{H}_2\text{O}$

526 (d)

It is a fact.

527 (d)

Electropositive character increases as we move down the group because of the increase in atomic size, atoms have more tendency to lose electrons. Hence, Cs is most electropositive element in alkali metals.

528 (b)

A deliquescent substance absorbs water to the

extent that it forms a saturated solution.

529 (a)

Group first elements are so highly electropositive that they emit electron, even when exposed to light (photoelectric effect) and this character increases on moving down the group from lithium towards caesium

530 (d)

The hydration energy of cations decrease with increase in size of cation.

531 (a)

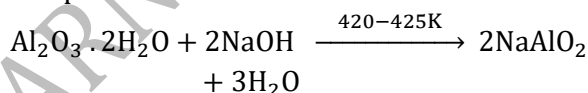
Due to ammonia solvated electrons.

532 (c)

Tincal is also known as borax; a natural mineral of Na and B.

534 (a)

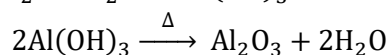
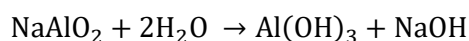
Baeyer's process or concentration of bauxite ore- Impure bauxite is treated with NaOH with which it forms water soluble sodium meta aluminate complex.



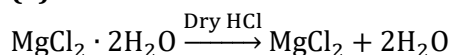
sod.

metaaluminate

Impurities such as  $\text{Fe}_2\text{O}_3$ ,  $\text{TiO}_2$  and silica are left behind. Pure alumina is recovered from solution.



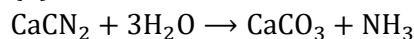
535 (a)



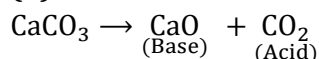
536 (b)

Sodium vapours on heating emit yellow light.

540 (d)



541 (d)



542 (c)

All the alkali halides except lithium fluoride are freely soluble in water.  $\text{I}_2$  (non-polar) is least soluble in water. Group IIA carbonates ( $\text{BaCO}_3$ ) are insoluble in water.  $\text{PbI}_2$  is sparingly soluble in cold water but quite soluble in hot water. KF (most polar) is most readily soluble in water.

543 (a)

I group elements possess lowest ionization enthalpy.

544 (c)

$\text{N}^{3-}$  has 7p, 10e and 7n.

- 545 (b)  
Sr imparts crimson red light to flame.
- 546 (d)  
The formula of carnallite is  $KCl \cdot MgCl_2 \cdot 6H_2O$ .  
In this formula only potassium gives colour (lilac) to flame, whereas magnesium does not give flame colouration.
- 547 (b)  
Zn dissolves in conc. NaOH due to the formation of sodium zincate.  
$$Zn + 2NaOH \rightarrow Na_2ZnO_2 + 2H_2O + 3NaCl$$
- 549 (b)  
Alkali metals cannot be obtained by electrolysis of their aqueous salt solutions.
- 550 (a)  
Salts of  $HClO_2$  are chlorites.
- 551 (c)  
 $CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$
- 552 (a)  
Nitrolim is  $CaCN_2 + C$ .
- 553 (b)  
Calcined gypsum does not contain  $CaCO_3$ .
- 554 (a)  
Formula of carnallite is  $KCl \cdot MgCl_2 \cdot 6H_2O$  so, carnallite contains K and Mg.
- 555 (b)  
The reactivity of alkali metals increases down the group.
- 556 (b)  
 $Mg + 2HNO_3 \rightarrow Mg(NO_3)_2 + H_2 \uparrow$

dil.

Hence, MgO is not formed in this reaction.

- 558 (b)  
It is used as reducing agent in organic reactions.
- 559 (b)  
Be, Mg form polymeric hydrides.
- 560 (a)  
On heating, it decomposes with evolution of  $CO_2$ .  
$$MgCO_3 \xrightarrow{\Delta} MgO + CO_2$$
- 561 (a)  
Lithium and magnesium shows diagonal relationship.
- 562 (a)  
 $Ca^{2+}$  and  $C_2^{2-}$  ions.
- 563 (c)  
The solubility of sulphates of alkaline earth metals decreases regularly on moving down the group because solubility product decreases from  $BeSO_4$  to  $BaSO_4$ . Hence, the order of solubility of their sulphates is
- |          |   |          |   |          |
|----------|---|----------|---|----------|
| $BeSO_4$ | > | $MgSO_4$ | > | $CaSO_4$ |
|          | > | $SrSO_4$ | > | $BaSO_4$ |
- $K_{sp}$  : very high      10       $2.4 \times 10^{-5}$       7.6  
 $\times 10^{-7}$        $1.5 \times 10^{-9}$
- 564 (c)  
Because of the larger size and smaller nuclear charge, alkali metals have low ionisation potential relative to alkaline earth metals



# THE S-BLOCK ELEMENTS

## CHEMISTRY

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### Assertion - Reasoning Type

This section contain(s) 0 questions numbered 1 to 0. Each question contains STATEMENT 1(Assertion) and STATEMENT 2(Reason). Each question has the 4 choices (a), (b), (c) and (d) out of which **ONLY ONE** is correct.

- a) Statement 1 is True, Statement 2 is True; Statement 2 **is** correct explanation for Statement 1
- b) Statement 1 is True, Statement 2 is True; Statement 2 **is not** correct explanation for Statement 1
- c) Statement 1 is True, Statement 2 is False
- d) Statement 1 is False, Statement 2 is True

1

**Statement 1:** Gypsum is added to cement to increase its rate of setting.

**Statement 2:** Gypsum is calcium sulphate hemihydrates.

2

**Statement 1:** Radium is most abundant s block elements.

**Statement 2:** S block elements are non radioactive in nature.

3

**Statement 1:** Group 1 elements are known as the alkali elements.

**Statement 2:** S orbital can accommodate only two electrons.

4

**Statement 1:** S block elements are highly electropositive.

**Statement 2:** The valance electrons present in s orbital are loosely held.

# THE S-BLOCK ELEMENTS

## CHEMISTRY

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**: ANSWER KEY :**

1) d    2) d    3) b    4) a

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# THE S-BLOCK ELEMENTS

## CHEMISTRY

### : HINTS AND SOLUTIONS :

- |   |  |
|---|--|
| <p>1 <b>(d)</b><br/>Gypsum is added to cement to decrease its rate of setting.<br/><br/>Gypsum is calcium sulphate dihydrate.</p> <p>2 <b>(d)</b><br/>Radium is rarest of all s-block elements. Francium is radioactive. Its long lived isotope <math>\text{Fr}^{223}</math> has a half-life of only 21 min.</p> <p>3 <b>(b)</b><br/>1. If Assertion is True, Reason is True, Reason is correct explanation of 1<br/><br/>2. If Assertion is True, Reason is True, Reason is not correct explanation of 1</p> | <p>3. If Assertion is True, Reason is False<br/><br/>4. If Assertion is False, Reason is True</p> <p>4 <b>(a)</b><br/>The loosely held s-electron in the outermost valence shell of these elements makes them, the most electropositive metals which readily give ion's <math>M^+</math> or <math>M^{2+}</math>.</p> |
|---|--|