



CHEMISTRY

BOOKS - CHHAYA CHEMISTRY (BENGALI ENGLISH)

s-BLOCK ELEMENTS

Warm Up Exercise

1. Name a radioactive alkali metal and write its atomic number.



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2. Mention the similarity shown in the electronic configurations of the alkali metals.

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3. Why alkali metals are called s -block elements?

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4. Which of the alkali metals exhibits abnormal behaviour?

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5. Which alkali metal is most abundant in the earth's crust?

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6. Francium is extremely scarce in nature-why?

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7. What is trona?

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8. Arrange lithium, sodium and potassium according to their abundance in the earth's crust.

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9. Give an example of a double salt formed by an alkali metal and alkaline earth metal.

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10. What type of crystal lattice is formed by the alkali metals?

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11. Arrange LiF, NaF, KF, RbF and CsF in increasing order of their lattice energies.

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12. Explain why the alkali metals have the largest atomic size in their respective periods.

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13. The alkali metals have the lowest ionisation enthalpies in their respective periods-Explain.



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14. Explain why the second ionisation enthalpies of alkali metals are very high.



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15. The hydration enthalpies of alkali metal ions decrease down the group from Li^+ to Cs^+ -Why?



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16. Why are the alkali metals good conductor of electricity?

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17. The alkali metals exhibit +I oxidation state-Explain your answer with reason.

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18. Why do alkali metals impart characteristic colour to the flame of bunsen burner?

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19. The alkali metals have low densities which however increase down the group. Explain with reason.

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20. Why are potassium and cesium, rather than lithium used in photoelectric cells?

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21. The alkali metals are soft in nature and this softness further increases down the group- Explain

with reason.



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22. Why lithium is kept wrapped in paraffin wax instead of preserving in kerosene?



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23. Why are alkali metals paramagnetic?



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24. Which alkali metal is generally used in photoelectric cells?

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25. Which alkali metals form superoxides when heated in excess air?

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26. Differentiate between Na_2CO_3 and $NaHCO_3$.

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27. When freshly cut, the alkali metals appear lustrous but their surfaces get tarnished when exposed to air. Explain your answer with reasons.



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28. Why metallic sodium is kept immersed in kerosene?



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29. Arrange MCl , MBr , MF and MI (where M = alkali metal) according to increasing covalent character.



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30. Explain why lithium, sodium and potassium forms monoxide, peroxide and superoxide respectively.



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31. KO_2 is paramagnetic but Li_2O is diamagnetic-Why?



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32. Lithium which liberates more energy reacts gently with water whereas potassium which liberates less energy reacts violently with water. Explain it with reasons.

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33. Explain why the ionic character of the hydrides of alkali metals increases down the group.

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34. Although the ionisation enthalpy of Li is the highest among all the alkali metals, it is the strongest reducing agent in aqueous medium. Explain with reasons.

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35. When an alkali metal dissolves in liquid ammonia the solution can acquire different colours. Explain the reasons for this type of colour change.

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36. Explain why alkali metals cannot be extracted by the application of common processes used for the extraction of other metals.



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37. Explain why the peroxides and superoxides of the alkali metals act as strong oxidising agents.



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38. Why does the basic strength of alkali metal hydroxides increase on moving down the group?



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39. The melting points of halides of a particular alkali metal decrease in the order: fluoride > chloride > bromide > iodide. Explain.



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40. The melting point of LiCl is less than that of NaCl and thereafter the melting points decrease on moving from NaCl to CsCl. Explain these observations.



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41. LiF is insoluble in water and CsI is sparingly soluble in water. Explain with reason.

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42. Why does Li_2CO_3 decompose at a much lower temperature whereas Na_2CO_3 decomposes at a much higher temperature?

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43. Give a simple test to distinguish between KNO_3 & $LiNO_3$.



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44. Explain why a solution of Na_2CO_3 is alkaline in nature whereas a solution of Na_2SO_4 is neutral.



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45. Among the sulphate salts of lithium, sodium, potassium and rubidium, which salt does not form double salt?



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46. What happens when sodium sulphate is fused with charcoal. Give equation.

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47. State the reasons behind the anomalous behaviour of Li.

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48. Which alkali metal bicarbonate has no existence in the solid state?

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49. Mention the property for which lithium is used to separate N_2 gas from a gas mixture?

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50. Give a simple test to distinguish between Li_2CO_3 & Na_2CO_3 .

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51. Mention the distinctive features of Li .

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52. Why does Li and Mg exhibit diagonal relationship?

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53. What is white metal? Mention its uses.

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54. Write down the name of the alkali metal compound which-

effective in the treatment of manic depressive psychosis.



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55. Write down the name of the alkali metal compound which-

used for the absorption of CO_2 from exhaled air in space capsules and submarines



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56. Write down the name of the alkali metal compound which-

used in baking powder.



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57. Write down the name of the alkali metal compound which-
used in antiknock additive.



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58. Write down the name of the alkali metal compound which-
used for extraction of gold.



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59. Name an alkali metal which is used in the Lassaigne's test for detection of nitrogen, sulphur and halogen in the organic compounds.

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60. Discuss the principle for the manufacture of sodium carbonate by Solvay process.

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61. K_2CO_3 cannot be prepared by Solvay process-

Why?



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62. What happens when washing soda is kept in air for

long time?



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63. What is fusion mixture?



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64. Explain why sodium carbonate on dissolution in water gives an alkaline solution.

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65. Explain why sodium carbonate is used in fire extinguishers.

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66. Why is sodium hydroxide also called caustic soda?
How would you prepare sodium hydroxide from sodium chloride?



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67. When NaOH is kept in air for a long time, it becomes wet and then it becomes dry due to formation of a solid crust over its surface. Explain the observations.



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68. Why does sodium hydrogen carbonate called baking soda?



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69. Why a standard solution of sodium hydroxide (NaOH) cannot be prepared?

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70. Discuss biological importance of sodium and potassium.

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71. How much sodium and potassium are expected to be present in typical human being weighing about 70 kg?



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72. What is the source of energy required for the transportation of ions across the cell membranes?



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73. How the group-2 elements are commonly known? Why are they so called?



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74. Write the general electronic configuration of group-2 elements.

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75. Why group-2 elements are called s-block elements?

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76. Which element of group-2 shows abnormal behaviour?

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77. Why alkaline earth metals are never found in the free state in nature?

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78. Which element of group-2 attains the electronic configuration of the noble gas argon after giving up the two valence electrons?

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79. Which group-2 element has a slightly different electronic configuration than the rest of the elements?



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80. Explain why the atomic and ionic radii of Mg is less than those of Na and Ca.



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81. The first ionisation enthalpy of Mg is higher than that of Na but the second ionisation enthalpy is lower

than that of Na -Explain.



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82. The alkaline earth metals exist as dipolar ions (M^{2+}) even though their second ionisation enthalpies are higher than those of their first ionisation enthalpies. Explain.



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83. The alkaline earth metals have less electropositive or metallic character as compared to those of alkali

metals and their electropositive or metallic character increases down the group. Explain with reasons.

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84. Explain why the alkaline earth metals do not exhibit oxidation state higher than + 2 .

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85. The melting and boiling points of alkaline earth metals are higher than those of alkali metals. Give reasons.

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86. How do you account for the higher density of alkaline earth metals as compared to those of alkali metals?

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87. Explain why the alkaline earth metals are good conductor of heat and electricity.

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88. Beryllium and magnesium do not impart colour to the flame. Why?

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89. Name the group-2 metal which forms covalent compounds.

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90. Explain why the alkaline earth metals are harder than alkali metals.

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91. Hydration enthalpies of the ions of alkaline earth metals are greater than that of the alkali metals. Explain.



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92. Arrange Mg^{2+} , Ba^{2+} , Sr^{2+} , Be^{2+} and Ca^{2+} according to decreasing order of their hydration enthalpies. Explain your answer.



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93. Why alkaline earth metals and their salts are diamagnetic?

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94. Alkaline earth metals are found in combined state-
Explain.

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95. Alkaline earth metals predominantly form ionic compounds. However, the first member of the group forms covalent compounds-Explain why?



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96. Group-2 metals get tarnished on exposure to air-
Explain.



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97. Beryllium when burnt in excess of oxygen gives monoxide (BeO), while barium when burnt in excess of oxygen gives peroxide (BaO_2) -Why?



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98. Why does beryllium hydride form polymer? Draw its polymeric structure. What type of bonding is present in it?



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99. Explain why the alkaline earth metals react with nitrogen to form nitrides even though nitrogen is a very stable and inert molecule.



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100. What is hydrolith? How can it be prepared?



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101. Explain why the carbide, MgC_2 is called an acetylide but the carbide, Be_2C is called a methanide.



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102. Alkaline earth metals cannot be extracted by ordinary methods-Explain.



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103. Why alkaline earth metals are weaker reducing agents than alkali metals?



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104. A white residue is obtained when metallic Mg is burnt in air. This residue when heated with water emits an ammoniacal smell. Explain these observations.



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105. Why calcium is better than sodium in eliminating small amount of water from alcohol?

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106. Why Mg-ribbon continues to burn in presence of SO_2 gas?

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107. Except $Be(OH)_2$, all other alkaline earth metal hydroxides are basic in nature and their basic

strength increases down the group. Explain with reasons.

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108. Why is $Mg(OH)_2$ less basic than NaOH?

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109. The solubility of alkaline earth metal hydroxides increases markedly on moving down the group. Give reason.

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110. Explain why the thermal stability of alkaline earth metal hydroxides increases down the group.

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111. BeF_2 is highly soluble in water while CaF_2 is almost insoluble in water. Explain.

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112. $BeCl_2$ (vapour) - Explain .

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113. $BeCl_2$ (solid) & mention the hybridisation state of Be in both cases-Explain.

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114. Why does the solubility of alkaline earth metal carbonates and sulphates in water decrease down the group?

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115. Explain why the thermal stabilities of alkaline earth metal carbonates increase down the group.



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116. Arrange $MgSO_4$, $BaSO_4$ and $CaSO_4$ in order of increasing solubility in water and explain the order.



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117. Magnesium nitrate crystallise with 6 molecules of water whereas barium nitrate crystallises as anhydrous salt. Explain.



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118. Sparingly soluble carbonate salts of alkaline earth metals become easily soluble in water in presence of CO_2 . Why?



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119. The anhydrous chloride salt of which alkaline earth metal is used as a drying agent in the laboratory?



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120. Why $BeCO_3$ is kept in an atmosphere of CO_2 ?



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121. Name a bivalent element whose oxide is soluble in excess NaOH solution.



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122. Why CaF_2 is considered the most important fluoride salt among all the fluoride salts of alkaline earth metals?



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123. Give equations to show amphoteric character of BeO.

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124. Explain why beryllium differs from the rest of the members of its group in many characteristics.

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125. Write down some important points of difference between beryllium and magnesium.

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126. Explain why beryllium resembles with aluminium, placed diagonally to each other.



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127. Name the alkaline earth metal used to extract metals from their oxides which cannot undergo carbon reduction process.



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128. What is magnesia cement? Write down its uses.



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129. Which alkaline earth metals are used to remove traces of air from vacuum tubes?



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130. What is Epsom salt? Give its important uses.



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131. What is magnalium? State its uses.



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132. Be usually forms covalent compounds but other elements of group-2 form ionic compounds. Why?

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133. Which alkaline earth metal combines with Zn to form the alloy 'electron'? Mention its use.

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134. Which compounds of the alkaline earth metals are used as refractory substance?

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135. The thermal decomposition of $CaCO_3$ is a reversible reaction. How does this reaction proceed almost to completion during the manufacture of quicklime?

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136. What is lime light?



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137. What do you understand by slaking of lime?



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138. Which compound is used to remove the acidic gangue like SiO_2 in metallurgy? Give the reaction.



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139. What is the difference between lime water and milk of lime?



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140. What happens when excess of CO_2 gas is passed through clear lime water?



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141. Carbonaceous impurities in gypsum and any fuel are avoided during preparation of Plaster of Paris. Explain.



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142. During preparation of Plaster of Paris from gypsum, the temperature is not allowed to rise above $120^{\circ}C$. Explain.



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143. Discuss the biological importance of Mg and Ca.



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144. How much Ca and Mg are expected to be present in a typical adult human body?



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145. What is the cause of the disease known as osteoporosis?

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146. What is the cofactor required by the all enzymes that utilise ATP in phosphate transfer?

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147. How can bleaching powder be prepared? Give reactions.



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148. Explain why lime water becomes turbid when CO_2 is passed through it and the turbid solution becomes clear again when more CO_2 is passed through it.



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149. Explain the following observation:

A white scum is formed on the surface of clear lime water when it is exposed to air.



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150. Explain the following observation:

Lumps of quicklime is converted into powder when exposed to air for some time.



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151. Explain the following observation:

Powdered Plaster of Paris soon sets into a hard mass on adding some water to



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152. Explain the following observation:

Clear lime water turns milky (turbid) on passing SO_2 through it. However, when excess of SO_2 is passed through the milky solution, it becomes clear again. The resultant clear solution turns milky on boiling.

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Question Answer Zone For Board Examination Very Short Answer Type

1. Name the first one-toed horse.

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2. Which one between water and pyrene (CCl_4), can be used to extinguish fire caused by metallic sodium?

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3. Which among the alkali metal ions has the lowest mobility in aqueous solution?

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4. Which of the alkali metal cations has the highest polarising power?

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5. Density of alkali metals are very low - why ?

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6. Which out of LiF of LiI is more covalent in nature.

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7. What alkali metal carbonate easily liberates CO_2 on heating ?

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8. Which alkali metal chloride imparts violet colour to the bunsen burner flame ?

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9. Which alkali metal hydride is used as source of hydrogen for filling up meteorological balloons?

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10. Name the products formed in the following reaction. Explain $LiI + KF \rightarrow ? + ?$



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11. What is water glass ?



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12. Which alkali metal combines with nitrogen to form the corresponding nitride ?



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13. The raw materials used in the manufacture of Na_2CO_3 by Solvay process are:



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14. Which out of Na_2CO_3 solution & $NaHCO_3$ solution, changes the colour of phenolphthalein into pink?



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15. What is the main ingredient of baking powder?



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16. Which compound is used to treat the flue gases from coal and oil-fired power stations and to remove SO_2 and H_2SO_4 responsible for acid rain?



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17. What are the ingredients of fusion mixture which is used in dry tests in inorganic analysis?



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18. Which is the most abundant alkaline earth metal in the earth's crust?



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19. Which alkaline earth metal is radioactive in nature?



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20. Name the metal of group-2 which is used to prepare Grignard reagent.



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21. Name the element of group-2 which resembles lithium in characteristics.

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22. Which alkaline earth metals do not impart any colour to the flame of a bunsen burner?

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23. Name an alkaline earth metal compound which can be used as a portable source of hydrogen.

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24. Which Gr-2 metal forms covalent compounds?

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25. Which Gr-2 metal burns readily when exposed to air?

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26. Which alkaline earth metal reacts with alkali to form hydrogen gas?

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27. What is the composition of the alloy, electron?

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28. Which reagent is used to analyse Ca^{2+} and Mg^{2+} ions quantitatively?

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29. What is the medicinal name of the aqueous solution of $Mg(OH)_2$?



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30. What is anhydron?

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31. How will you distinguish between $BeSO_4$ & $BaSO_4$?

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32. Which out of $MgCO_3$, $SrCO_3$ and $BaCO_3$, possesses highest thermal stability ?

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33. Distinguish between $Be(OH)_2$ and $Ba(OH)_2$.

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34. Why is $BeCl_2$ soluble in organic solvent ?

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35. Which Gr -2 metal carbonate is unstable in air ?

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36. Which alkline earth metal sulphate is useful in diagonising stomach ulcers by X- ray ?

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37. BeO is covalent but still it has much higher melting point - mention the reason.

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38. Write a reaction by which $BeCl_2$ can be prepared.

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39. What is the composition of sodalime used for the preparation of hydrocarbons in the laboratory ?

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40. Name two acidic oxides which react similarly with calcium hydroxide $[Ca(OH)_2]$.

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41. Which alkaline earth metal oxide is used as a flux in metallurgy to remove siliceous impurities ?

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42. What is the commercial name of the disinfectant powder obtained when Cl_2 reacts with slightly moist slaked lime at $40^\circ C$?



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43. Plaster of paris is



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44. What type of impurities in gypsum should be avoided in preparing Plaster of Paris from it ?



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45. Why KNO_3 is used instead of $NaNO_3$ in gunpowder ?



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46. What do you mean by 'black ash' ?



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47. What happens when magnesium is heated with acetylene at 875 K ?



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48. Which calcium salt causes formation of kidney stones ?



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Question Answer Zone For Board Examination Short Answer Type

1. why are alkali metals stored in kerosene ?



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2. Alkali metals are good reducing agents - Why ?

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3. Explain why the alkali metals cannot be obtained by reducing method.

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4. Which alkali metal ion has maximum polarising power and why ?

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5. What makes lithium exhibit uncommon properties compared to the rest of the alkali metals?

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6. What is the common oxidation state exhibited by the alkali metals and why?

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7. Fire caused by sodium in the laboratory cannot be extinguished by spraying water-Why?

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8. Why does Li not exist with Na or K in their minerals?

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9. What is the difference between baking soda and baking powder?

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10. Though table salt is not deliquescent but it gets wet in rainy season - Explain.



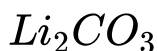
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11. A freshly cut piece of sodium metal appear shiny but its metallic lustre soon gets tarnished when exposed to air. Give reason.



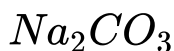
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12. What happens when each of the following compound is heated?



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13. What happens when each of the following compound is heated?



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14. What happens when each of the following compound is heated?



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15. What happens when each of the following compound is heated?



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16. What happen when Hclgas is passed through a concentrated solution of common NaCl containing impurities like Na_2SO_4 , $CaSO_4$. $CaCl_2$, $MgCl_2$ etc.



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17. What happen when caustic soda beads are exposed to air for a long time.

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18. How will you convert Na_2CO_3 into $NaHCO_3$ and vice versa ?

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19. Why do Gr-2 metals not exist in free state in nature?

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20. Which out of Na^+ and Mg^+ ion, has greater polarising power and why?

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21. The abundance of Be in the nature is very low - why?

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22. What precautions should be taken while handling beryllium compounds and why?



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23. Explain why the elements of group-2 form M^{2+} ions but not M^{3+} ions.



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24. Arrange $Be(OH)_2$, $Ba(OH)_2$ & $Ca(OH)_2$ in order of increasing solubility in water and explain the order.



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25. How can you prepare propyne from magnesium carbide?

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26. The reaction between marble and dilute H_2SO_4 is not used to prepare CO_2 gas-why?

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27. Why are the group-2 metals harder and have higher melting and boiling points than group-1 metals?



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28. Give some common tests used for detection of calcium compounds.



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29. A white solid (A) when heated liberates a colourless gas which does not support combustion. The residue is dissolved in water to form (B) which can be used for whitewashing. When excess of CO_2 gas is passed through the solution of (B), it gives a

compound {C} which on heating forms (A). Identify (A), (B) and (C). Give the reactions.

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30. Compare the alkali metals and alkaline earth metals with respect to their basicity of oxides

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31. Compare the alkali metals and alkaline earth metals with respect to their solubility of hydroxides.

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32. Compare the alkali metals and alkaline earth metals with respect to their solubility of nitrates.

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33. Why halides of Be dissolve in organic solvents while those of Ba do not?

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34. Name the important compound of Li used in organic synthesis. How the compound is prepared?

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35. What is the oxidation state of K in KO_2 and why is this compound paramagnetic?

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36. Write the composition of gunpowder.

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37. Why is $\text{Na}_2\text{S}_2\text{O}_3$ used in photography?

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38. The affinity of sodium towards water is used in drying benzene. Explain.



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39. The crystalline salts of alkaline earth metals contain more water of crystallisation than the corresponding alkali metals. Explain.



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40. Lithium salts are more stable if the anion present in the salt is small. Explain.



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41. What are the properties that make oxides of MgO and BeO useful for lining furnaces?



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42. How will you distinguish between : Mg and Ca



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43. How will you distinguish between :
 Na_2SO_4 and $BaSO_4$



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44. How will you distinguish between :
 Na_2CO_3 and $NaHCO_3$



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45. How will you distinguish between :
 $LiNO_3$ and KNO_3



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1. Write with balanced equation the reaction for the manufacture of sodium bicarbonate from sodium carbonate.



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2. Describe with reaction the industrial preparation of sodium hydroxide. How is this sodium hydroxide purified?



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3. Name a pair of elements which exhibits diagonal relationship.

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4. Name an alkaline earth metal.

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5. Write the balanced equation for the reaction when water is added to calcium carbide.

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6. Write the balanced equation(s) for the reaction when excess carbon dioxide is passed through brine saturated with ammonia.



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7. Which of the following is less stable thermally-

A. LiF

B. KCl

C. RbF

D. CsF

Answer: B



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8. Which of the following pairs is responsible for developing an electric potential across the membrane of living cells-



Answer: C



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9. The halides of alkali metals are soluble in water except for LiF. Why?



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10. What is diagonal relationship? Give one example.



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11. Which one of the following chlorides is soluble in organic solvent-

A. CaCl_2

B. NaCl

C. MgCl_2

D. BeCl_2

Answer: D



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12. Which of the following alkaline earth metal carbonates is thermally least stable -

A. BeCO_3

B. $CaCO_3$

C. $SrCO_3$

D. $BeCO_3$

Answer: D



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13. Why is LiCl soluble in organic solvent?



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14. Why are fumes seen when barium halides are kept in open air ?

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15. Alkali metals become opaque when they are kept open in air-Why?

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16. Write the basic principles of Solvay process.

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17. $BaSO_4$ is insoluble in water, but $BeSO_4$ is soluble in water-Explain.



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18. Cause of different colour of the flame in flame test is -

A. low ionisation potential

B.

C. malleability

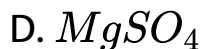
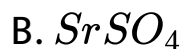
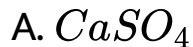
D. presence of one electron in the outermost orbit

Answer: A



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19. Which of the following alkaline earth metal sulphate is most soluble in water-



Answer: D



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20. Why do most of the lithium salts are present as hydrated one?

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21. Which of the alkaline earth metal hydroxide are amphoteric in nature.

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22. What is hydrolyth?





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23. What will be the order of reducing powder of the following elements-

A. Li B. Na C. K D. Rb E. Cs



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24. What happens when $LiNO_3$ is strongly heated?

Write down the equation.



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25. Which two alkaline earth metals cannot be identified by flame test?



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26. Write down the preparation of Plaster of Paris with equation.



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27. Which one of the following elements shows diagonal relationship with magnesium-

A. Na

B. Li

C. Be

D. Ca

Answer: B



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28. Sodium is preserved in which of the following liquids-

A. water

B. ethanol

C. kerosene oil

D. methanol

Answer: C

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29. Write the principle, with balanced chemical equations, of preparation of sodium carbonate by Solvay process?

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Solved Ncert Exercise

1. What are the common physical and chemical features of alkali metals?

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2. Why are alkali metals not found in nature?

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3. Find out the oxidation state of sodium in Na_2O_2 .

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4. Explain why is sodium less reactive than potassium.

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5. Compare the alkali metals and alkaline earth metals with respect to ionisation enthalpy.

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6. Compare the alkali metals and alkaline earth metals with respect to basicity of oxides.

 [Watch Video Solution](#)

7. Compare the alkali metals and alkaline earth metals with respect to solubility of hydroxides.

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8. In what ways lithium shows similarities to magnesium in its chemical behaviour?

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9. Explain why can alkali and alkaline earth metals not be obtained by chemical reduction methods ?



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10. Why are potassium and cesium, rather than lithium used in photoelectric cells?



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11. When an alkali metal dissolves in liquid ammonia the solution can acquire different colours. Explain the reasons for this type of colour change.



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12. Beryllium and magnesium do not give colour to flame whereas other alkaline earth metals do so. Why?



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13. Discuss the various reactions that occur in the Solvay process.



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14. Potassium carbonate cannot be prepared by Solvay process. Why?



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15. Why is Li_2CO_3 decomposed at a lower temperature whereas Na_2CO_3 at higher temperature?



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16. Compare the solubility and thermal stability of the given compounds of the alkali metals with those of the alkaline earth metals.

Nitrates



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17. Compare the solubility and thermal stability of the given compounds of the alkali metals with those of the alkaline earth metals.

Carbonates.

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18. Compare the solubility and thermal stability of the given compounds of the alkali metals with those of the alkaline earth metals.

Sulphates.

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19. Starting with sodium chloride how would you proceed to prepare sodium metal ?

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20. Starting with sodium chloride how would you proceed to prepare sodium hydroxide ?

 [Watch Video Solution](#)

21. Starting with sodium chloride how would you proceed to prepare sodium peroxide ?



[Watch Video Solution](#)

22. Starting with sodium chloride how would you proceed to prepare sodium carbonate?



[Watch Video Solution](#)

23. What happens when magnesium is burnt in air?



[Watch Video Solution](#)

24. What happens when quicklime is heated with silica?



[Watch Video Solution](#)

25. What happen when chlorine reacts with slaked lime ?



[Watch Video Solution](#)

26. What happen when calcium nitrate is heated?



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27. Describe two important uses of each of the following :

caustic soda.



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28. Describe two important uses of each of the following :

sodium carbonate.



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29. Describe two important uses of each of the following :

quicklime.



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30. Draw the structure of $BeCl_2$ (vapour).



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31. Draw the structure of $BeCl_2$ (solid).



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32. $NaOH$, KOH , Na_2CO_3 , K_2CO_3 are easily soluble in water while the corresponding salts of

magnesium and calcium are sparingly soluble in water. Explain

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33. Describe the importance of the given: limestone.

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34. Describe the importance of the given: cement.

 [Watch Video Solution](#)

35. Describe the importance of the given: Plaster of Paris.

 [Watch Video Solution](#)

36. Why are lithium salts commonly hydrated and those of the other alkali ions usually anhydrous?

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37. Why is LiF almost insoluble in water whereas LiCl soluble not only in water but also in acetone?

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38. Explain the significance of sodium, potassium, magnesium and calcium in biological fluids.



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39. What happen when sodium metal is dropped in water ?



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40. What happen when sodium metal is heated in free supply of air ?



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41. What happens when sodium peroxide dissolves in water?



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42. Comment on each of the given observations : The mobilities of the alkali metal ions in aqueous solution are $Li^+ < Na^+ < K^+ < Rb^+ < Cs^+$



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43. Comment on each of the given observations :
Lithium is the only alkali metal to form a nitride directly.



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44. Comment on each of the given observations : E^0 for $M^{2+}(aq) + 2e \rightarrow M(s)$ (where $M = \text{Ca, Sr or Ba}$) is nearly constant.



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45. State as to why a solution of Na_2CO_3 is alkaline?



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46. State as to why alkali metals are prepared by electrolysis of their fused chlorides?



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47. State as to why sodium is found to be more useful than potassium?



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48. Write balanced equations for reactions between Na_2O_2 & water.

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49. Write balanced equations for reactions between KO_2 & water.

 [Watch Video Solution](#)

50. Write balanced equations for reactions between Na_2O & CO_2 .

 [Watch Video Solution](#)

51. How would you explain the given observations?

BeO is almost insoluble but $BeSO_4$, is soluble in water.



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52. How would you explain the given observations?

BaO is soluble but $BaSO_4$, is insoluble in water.



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53. How would you explain the given observations?

Lil is more soluble than KI in ethanol.

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54. Which of the alkali metal is having least melting point ? 1. Na 2. K 3. Rb 4. Cs

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55. Which one of the following alkali metals gives hydrated salts? 1. Li 2. Na 3. K 4. Cs

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56. Which one of the alkaline earth metal carbonates is thermally the most stable?

1. $MgCO_3$ 2. $CaCO_3$ 3. $SrCO_3$ 4. $BaCO_3$



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Higher Order Thinking Skill Hots Questions

1. Li^+ ion is the smallest one among the ions of group-1 elements. It would, therefore, be expected to have much higher ionic mobility and hence the solutions of lithium salts would be expected to have

higher conductivity than that of solutions of cesium salts. However in reality, the reverse is observed. Explain.

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2. The E^0 value for Cl_2/Cl^- is + 1.36, for I_2/I^- is +0.53V, for Ag^+/Ag is + 0.79V, for Na^+/Na is - 2.71V and for Li^+/Li is -3.04 V. Arrange the following atoms and ions in decreasing order of their reducing strength: I^- , Ag , Cl^- , Li , Na

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3. The alkali metals are obtained not by the electrolysis of the aqueous solutions of their salts but by the electrolysis of their molten salts. Explain.



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4. The alkali metals are paramagnetic but their salts are diamagnetic-why?



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5. Beryllium & magnesium do not give colour to flame whereas other alkaline earth metals do so. Why?



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6. E^0 for $M^{2+}(aq) + e \rightarrow M(s)$ (where, M = Ca, Sr or Ba) is nearly constant. Comment.



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7. Both alkaline earth metals and their salts are diamagnetic in nature. Explain.



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8. Beryllium salts can never have more than 4 molecules of water of crystallisation, i.e., it can never achieve coordination number > 4 while other metal ions tend to have a coordination number of 6, e.g., $[Ca(H_2O)_6]^{2+}$. Explain.

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9. How can anhydrous magnesium chloride be prepared from magnesium chloride hexahydrate?

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10. Anhydrous is used as a drying agent - why?

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11. Which out of $BeCl_2$ and $CaCl_2$ would give acidic solution when dissolved in water?

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12. Li-salts are commonly hydrated while other alkali metal salts are usually anhydrous. Explain.

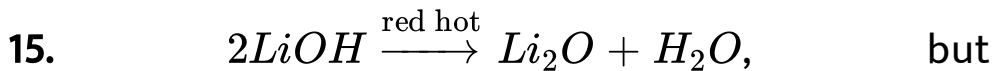
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13. Although the abundance of Na and K in the earth's| crust are comparable, sodium is nearly 30 times more abundant than potassium in sea water-why?

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14. When caustic soda solution is kept in a glass bottle, the inner surface of the bottle becomes opaque. Explain.

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Explain the above observations.

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17. Discuss the roles of Na_2O_2 and $LiOH$ in the purification of air.

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18. Lithium forms monoxide while sodium forms peroxide in the presence of excess oxygen-why?

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19. The second ionisation enthalpies of alkaline earth metals are much lower than those of the corresponding alkali metals. Explain.

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20. Explain why the compounds of beryllium are much more covalent than the other Gr-2 metal compounds.

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21. Beryllium compounds are extremely toxic--why?

 [Watch Video Solution](#)

22. MgO is used as a refractory material- Explain why?

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23. $BaSO_4$ is insoluble in water whereas $BeSO_4$ is soluble in water - explain with reasons.

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24. $BeCl_2$ fumes in moist air but $BaCl_2$ does not. Explain.

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25. Mg_3N_2 when reacts with water, gives off NH_3 but HCl is not evolved when $MgCl_2$ reacts with water at room temperature. Give reasons.

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26. A piece of burning magnesium ribbon continues to burn in sulphur dioxide. Explain.

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27. Ba^{2+} ions are poisonous, still they are provided to patients before taking stomach X-ray. Explain.

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28. Can sodium hydride be dissolved in water? Justify.





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29. Why does sodium impart yellow colour in the flame?



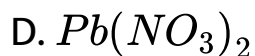
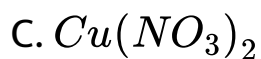
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Entrance Question Bank

1. NO_2 is not obtained on heating -

A. $AgNO_3$

B. KNO_3

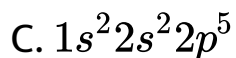
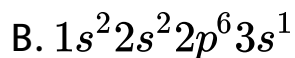
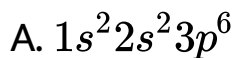


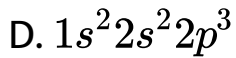
Answer: B



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2. Which one of the following has the lowest ionisation energy-



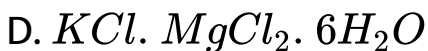
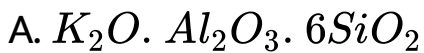


Answer: B



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3. Which of the following represents the composition of carnallite mineral-



Answer: D



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4. Chlorine gas reacts with red hot calcium oxide to give -

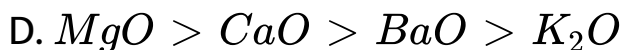
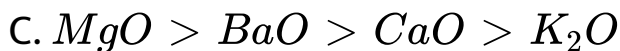
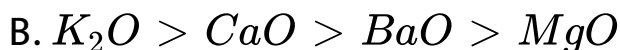
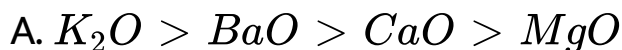
- A. beaching powder and dichlorine monoxide
- B. bleaching powder and water
- C. calcium chloride and chlorine dioxide
- D. calcium chloride and oxygen

Answer: D



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5. The decreasing order of basic character of K_2O , BaO , CaO and MgO is -



Answer: A



6. Match the Flame colours of the alkaline earth metal salts in the Bunsen burner.

(a) calcium (p) brick red

(b) strontium (q) apple green

(c) barium crimson red

A. (a)- (p), (b)- (r), (c) -(q)

B. (a)-(r), (b)-(p), (c) -(l)

C. (a)-(q), (b)-(r), (c)-(p)

D. (a)- (p), (b) - (q), (c) - (r)

Answer: A



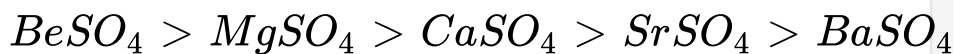
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7. The correct order of solubility in water is-

A.



B.



C.



D.



Answer: B



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8. When $BaCl_2$ is added to an aqueous solution, a white precipitate is obtained. The anion among CO_3^{2-} , SO_3^{2-} and SO_4^{2-} that was present in the solution can be -

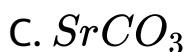
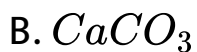
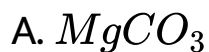
- A. CO_3^{2-} but not any of the other two
- B. SO_3^{2-} but not any of the other two
- C. SO_4^{2-} but not any of the other two
- D. none of them

Answer: D



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9. Which of the following is least thermally stable-

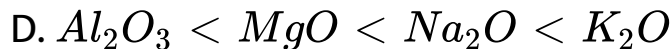
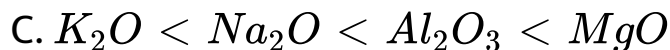
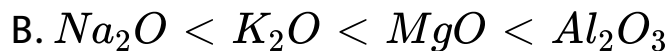
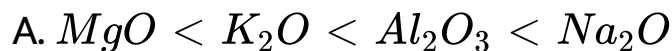


Answer: D



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10. Which one of the following orders presents the correct sequence of the increasing basic nature of the given oxides -

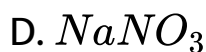
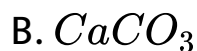


Answer: D



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11. Which of the following on thermal decomposition yields a basic as well as an acidic oxide-

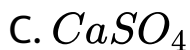
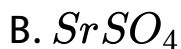


Answer: B



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12. Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than lattice enthalpy -

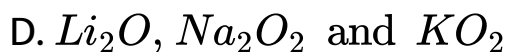
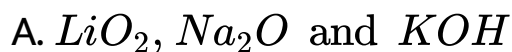


Answer: D



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13. The main oxides formed on combustion of Li, Na and K in excess of air respectively are -



Answer: D



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14. Although lithium and magnesium resemble each other in properties due to diagonal relationship, the following statement which is not correct is-

A. both of them form nitride compound

B. when nitrates of both Li and Mg are heated,

NO_2 and O_2 are obtained

C. both of them form basic carbonate salt

D. both of them form soluble bicarbonate salt

Answer: C



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15. Match List-I with List-II for the compositions of substances and select the correct answer using the code given below-

List I (Substances)		List II (Composition)	
(a)	Plaster of Paris	(i)	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
(b)	Epsomite	(ii)	$\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$
(c)	Kieserite	(iii)	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
(d)	Gypsum	(iv)	$\text{MgSO}_4 \cdot \text{H}_2\text{O}$
		(v)	CaSO_4

A. (a)-(ii), (b)-(iv), (c)-(i), (d)-(ii)

B. (a)-(ii), (b)-(iii), (C)-(iv), (d)-(i)

C. (a)-(i), (b)-(ii), (c)-(iii), (d)-(v)

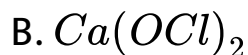
D. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

Answer: B



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16. Which one of the following is present as an active ingredient in bleaching powder for bleaching action -

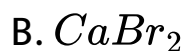
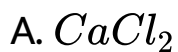


Answer: B



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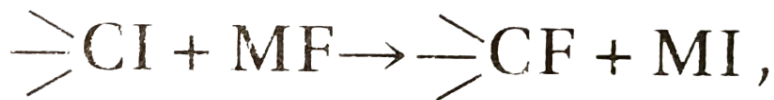
17. Which of the following has the lowest melting point-



Answer: C



18. In case of replacement reaction



the

reaction will be most favourable if M happens to be-

A. K

B. Rb

C. Li

D. Na

Answer: B



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19. Which one of the alkali metals forms only the normal oxide M_2O on heating in air-

A. Li

B. Na

C. Rb

D. K

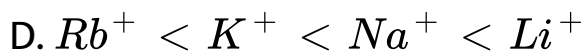
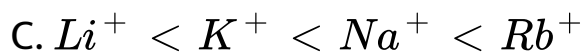
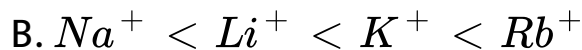
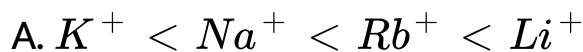
Answer: A



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20. The ease of adsorption of the hydrated alkali metal ions on the ion-exchange resins follows the

order -

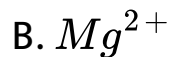


Answer: D



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21. Be^{2+} is isoelectronic with which of the following ions -

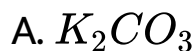


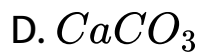
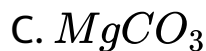
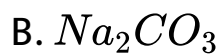
Answer: D



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22. On heating which of the following releases CO_2 most easily -





Answer: C



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23. In contrast with beryllium, which one of the following statements is incorrect -

A. it forms Be_2C

B. its salts rarely hydrolysed

C. its hydride is electron deficient and polymeric

D. it is rendered passive by nitric acid

Answer: B



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24. The suspension of slaked lime in water is-

A. quicklime

B. milk of lime

C. aqueous solution of slaked lime

D. lime water

Answer: B



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25. Which of the following statements is false

A. Mg^{2+} ions form a complex with ATP

B. Ca^{2+} ions are important in blood clotting

C. Ca^{2+} ions are not important in maintaining
the regular beating of the heart

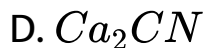
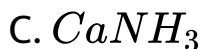
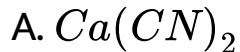
D. Mg^{2+} ions are important in the green parts of
plants

Answer: C



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26. The product obtained as a result of a reaction of nitrogen with CaC_2 is -

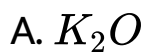


Answer:



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27. Which one of the following takes up CO_2 and releases O_2 -



Answer: C



28. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of these salts is put under an electric field -

A. K

B. Rb

C. Li

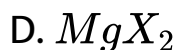
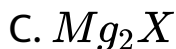
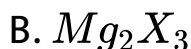
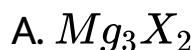
D. Na

Answer: C



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29. Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is $1s^2 2s^2 2p^3$ the simplest formula for this compound is-



Answer: A



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30. Which of the following oxides is most acidic in nature -

A. CaO

B. MgO

C. BaO

D. BeO

Answer: D



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31. Among CaH_2 , BeH_2 , BaH_2 the order of ionic character is-



Answer: B



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32. Which of the following is not hygroscopic -

A. CsCl

B. $MgCl_2$

C. $CaCl_2$

D. $LiCl$

Answer: A

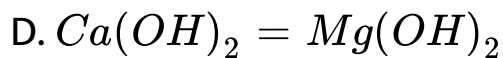
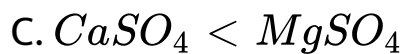


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33. Which is correct order of solubility in water-

A. $Ba(OH)_2 < Mg(OH)_2$

B. $BaCO_3 > CaCO_3$

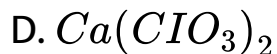
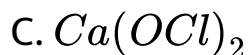
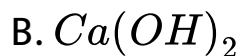
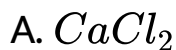


Answer: C



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34. Bleaching powder does not contain-



Answer: D



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35. Which of the following statements is incorrect

A. Li^+ has minimum degree of hydration

B. The oxidation state of K in KO_2 is +1

C. Na is used to make a Na/Pb alloy

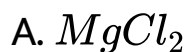
D. $MgSO_4$ is readily soluble in water

Answer: A



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36. Which of the following has highest hydration energy -

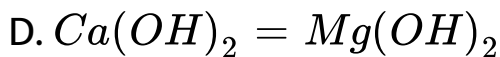
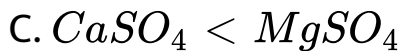
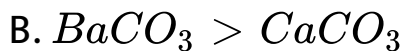
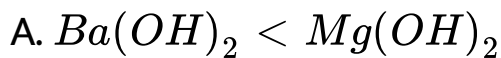


Answer: A



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37. Which is correct order of solubility in water -



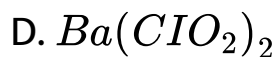
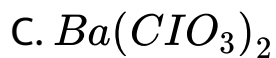
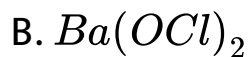
Answer: C



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38. What is the product of the reaction between dilute solution of $Ba(OH)_2$ and $H_2O_2 + ClO_2^-$

A. HOCl



Answer: D



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Mcq Hotspot Single Correct Type

1. Which of the following compounds transforms baking soda into baking powder-



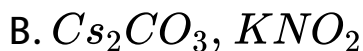
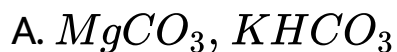


Answer: C



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2. Which of the following pair of compounds does not undergo any chemical change on heating



C. Na_2CO_3 , $NaNO_3$

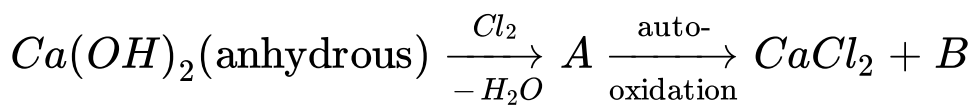
D. Li_2CO_3 , KNO_2

Answer: B



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3.

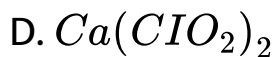


In this reaction, B is-

A. $CaOCl_2$

B. $Ca(ClO_3)_2$

C. $Ca(OH)_2$



Answer: B



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4. The blue colour of potassium solution in liquid ammonia is due to the presence of -

- A. solvated electron
- B. potassium amide
- C. impurities present in potassium
- D. potassium oxide

Answer: A



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5. The alkali metal that does not participate in the reaction $MI + I_2 \rightarrow MI_3$ is

A. Na

B. K

C. Rb

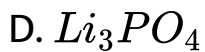
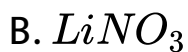
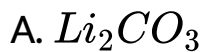
D. Cs

Answer: A



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6. The lithium compound which is soluble in water is-



Answer: B



7. An alkaline earth metal when heated along with nitrogen forms X. On hydrolysis, X forms an insoluble basic compound and a gas which turns $CuSO_4$ solution deep blue. The metal is-

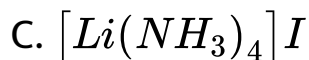
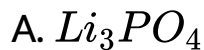
- A. Be
- B. Ca
- C. Mg
- D. Ba

Answer: C



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8. Which of the following compounds exists in only aqueous solution-



Answer: D



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9. Which of the following acids does not liberate CO_2 on reacting with sodium carbonate-

A. dilute HCl

B. dilute H_3BO_3

C. dilute H_3PO_4

D. dilute H_2SO_4

Answer: B



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10. Hydrated $BeCl_2$ acts as a/an-

A. lewis base

B. arrhenius base

C. arrhenius acid

D. lewis acid

Answer: D



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11. Which of the following compounds or pair of compounds is responsible for turning yellow sodium peroxide white in presence of air-

A. Na_2O

B. $NaOH$ and Na_2CO_3

C. H_2O_2

D. $NaOH$ and H_2O_2

Answer: B



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12. The chemical formula of microcosmic salt is-

A. $NaHPO_{4.2}H_2O$

B. $(NH_4)_3HPO_4 \cdot 2H_2O$

C. $Na(NH_4)HPO_4 \cdot 4H_2O$

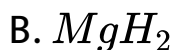


Answer: C



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13. The hydride which does not form as a result of direct reaction between the metal and hydrogen is-

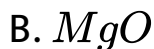


Answer: C



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14. An amphoteric oxide dissolves in HCl to form a salt. The salt does not impart any characteristic colour to the flame but fumes in moist air. The oxide is-



Answer: C



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15. The difference in number of water molecules in gypsum and Plaster of Paris is -

A. $5/2$

B. 2

C. $1/2$

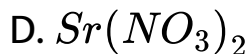
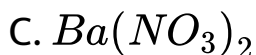
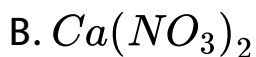
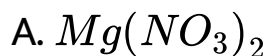
D. $3/2$

Answer: D



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16. Compound A imparts brick red colour to the flame and decomposes on heating to produce oxygen and a brown gas. A is -



Answer: B



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17. The sodium salt of an unknown anion when heated with $MgCl_2$ forms a white precipitate. The anion is -



Answer: C



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18. The salt which is added to table salt to keep it dry and free flowing is -

A. KCl

B. $Ca_3(PO_4)_2$

C. KI

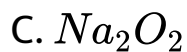
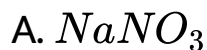
D. Na_3PO_4

Answer: B



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19. The compound which acts as an oxidising as well as a reducing agent is-



Answer: C



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20. The compound which is used to extinguish fire caused by combustion of alkali metals is-

A. CCl_4

B. sand

C. water

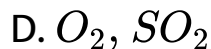
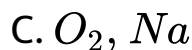
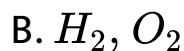
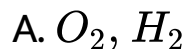
D. kerosene

Answer: A



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21. An aqueous solution of sodium sulphate is electrolysed using inert electrodes. The products formed at the cathode and anode respectively are-

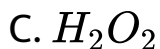
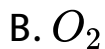


Answer: A



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22. Sodium when heated at $300^{\circ}C$ in air forms X which absorbs CO_2 to form Na_2CO_3 and a compound Y. The compound Y is-



Answer: B



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23. Excess Na^+ ions in the human body causes-

- A. diabetes
- B. anaemia
- C. low blood pressure
- D. high blood pressure

Answer: D



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24. The metal carbide which on hydrolysis produces allylene or propyne is-

A. Be

B. Ca

C. Al

D. Mg

Answer: D



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25. A metal M readily forms water soluble sulphate MSO_4 water insoluble hydroxide and oxide MO. The oxide remains inert on heating. The hydroxide is soluble in NaOH. M is -

A. Be

B. MgO

C. Ca

D. Sr

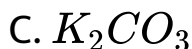
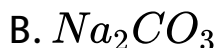
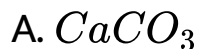
Answer: A



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26. When a compound A is heated, it produces a colourless gas and the residue obtained is dissolved in water to form the compound B. The compound C is formed when excess CO_2 is passed through aqueous

solution of B. The compound C can be separated out in solid state from its solution. C in its solid state when heated forms the compound A. A is-



Answer: A



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27. When metals A and B are heated in air, A only forms oxide but B forms both oxide and nitride. A and B are

A. Cs, K

B. Mg, Ca

C. Li, Na

D. K, Mg

Answer: D



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28. The alkali metal which emits a light of longest wavelength in the flame test is-

A. Na

B. K

C. Cs

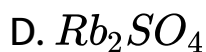
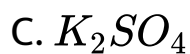
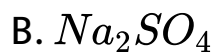
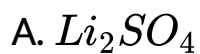
D. Li

Answer: B



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29. The compound which does not form a double salt is-

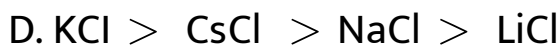
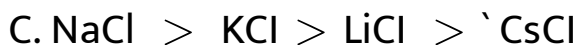
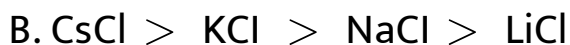
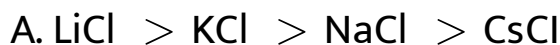


Answer: A



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30. The decreasing order of stability of the chloride salts of alkali metals is-



Answer: D



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31. The affinity of sodium for water is used for drying

A. alcohol

B. ammonia

C. benzene

D. phenol

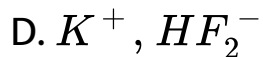
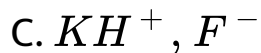
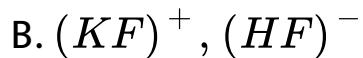
Answer: C



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32. The ions present in an anhydrous mixture of potassium fluoride and hydrofluoric acid are -

A. K^+ , H^+ , F^-



Answer: D



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33. The correct order of covalent character in the following compounds is-



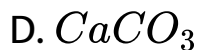
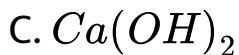
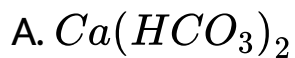


Answer: C



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34. A chemical compound A is used for the recovery of ammonia during preparation of washing soda. When CO_2 is passed through the aqueous solution of A, the solution turns turbid. A is used for white-washing because of its disinfecting properties. The chemical formula of A is-



Answer: C



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35. The compound used for drying neutral or basic gases is-

A. calcium carbonate

B. sodium carbonate

C. sodium bicarbonate

D. calcium oxide

Answer: D



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36. Which of the following compounds does not contain calcium carbonate-

A. dolomite

B. marble statue

C. burnt gypsum

D. snail shell

Answer: C



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37. The compound which on thermal decomposition produces a basic and an acidic oxide is-

A. $KClO_3$

B. Na_2CO_3

C. $NaNO_3$

D. CaCO_3

Answer: D



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38. Which of the following oxides does not react with water

A. BeO

B. CaO

C. MgO`

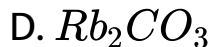
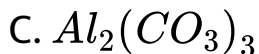
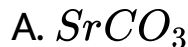
D. SrO

Answer: A



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39. Which of the following carbonates is soluble in water -

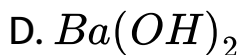


Answer: C



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40. The compound whose aqueous solution is called 'baryta water' is-



Answer: D



41. The alkali metal which emits a light of shortest wave-length in the flame test is

A. Na

B. K

C. Cs

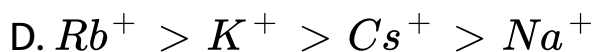
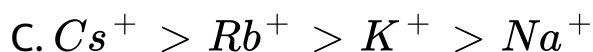
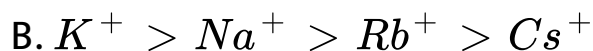
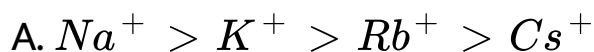
D. Li

Answer: C



Watch Video Solution

42. The correct order of ionic mobility of the following ions in their aqueous solution is-



Answer: C



Watch Video Solution

43. Which of the following compounds is not used for storing or immersing metallic sodium-

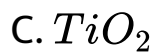
- A. benzene
- B. kerosene
- C. ethanol
- D. toluene

Answer: C



Watch Video Solution

44. Which of the following compounds is paramagnetic



Answer: A



Watch Video Solution

45. KO_2 is used in oxygen cylinders that are used for submarines and spacecrafts because -

A. it increases the amount of oxygen by absorbing



B. it eliminates water vapour

C. it absorbs CO_2

D. It forms O_3

Answer: A



Watch Video Solution

46. Which of the following compounds is most stable-

A. LiF

B. LiCl

C. LiBr

D. LiI

Answer: A



Watch Video Solution

47. The alkali metal for which photoelectric effect is maximum is -

A. Cs

B. Na

C. K

D. Li

Answer: A



Watch Video Solution

48. The melting points of alkali metals are low. Which of the alkali metals melts when room temperature becomes more than $30^{\circ}C$ -

A. K

B. Na

C. Cs

D. Rb

Answer: C



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49. Which of the following alkali metal hydroxides is the most basic in nature-

A. CsOH

B. KOH

C. LiOH

D. RbOH

Answer: A



Watch Video Solution

50. The metal whose carbonate salt is the most stable is-

A. Na

B. Mg

C. Al

D. Si

Answer: A



Watch Video Solution

51. Which of the following compounds is used for manufacturing soft soaps-

A. KOH

B. NaOH

C. LiOH

D. $Mg(OH)_2$

Answer: A



Watch Video Solution

52. The atomic number of a radioactive alkali metal is-

A. 55

B. 87

C. 19

D. 37

Answer: B



Watch Video Solution

53. Which of the following is used for the manufacture of high temperature thermometers-

- A. an alloy of Li and Na
- B. an alloy of Na and Cs
- C. an alloy of Na and K
- D. an alloy of K and Rb

Answer: C



Watch Video Solution

54. The mixture of $MgCl_2$ and MgO is known as -

- A. Sorel's cement
- B. Portlant cement
- C. Alum
- D. Magnesium oxychloride

Answer: A



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55. Which of the following alkaline earth metals does not form its corresponding hydride by directly reacting with hydrogen-

A. Mg

B. Sr

C. Be

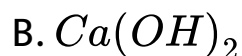
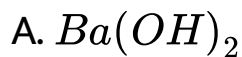
D. Ba

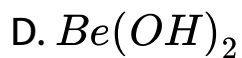
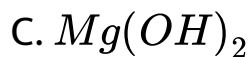
Answer: C



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56. Which of the following alkaline earth metal hydroxides is soluble in NaOH solution-



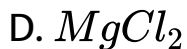


Answer: D



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57. The chloride salt which is soluble in ethanol is-



Answer: A



Watch Video Solution

58. Which of the following is produced when one mole of magnesium nitride reacts with excess of water-

A. one mole of ammonia

B. one mole of nitric acid

C. two mole of ammonia

D. two mole of nitric acid

Answer: C



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59. Which of the following method is used for the preparation of calcium-

A. reduction of CaO by carbon

B. reduction of CaO by hydrogen

C. electrolysis of a mixture of anhydrous

CaCl_2 and KCl

D. electrolysis of molten $\text{Ca}(\text{OH})_2$

Answer: C



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60. Which alkaline earth metal ion plays a vital role in contraction of muscles-



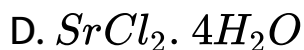
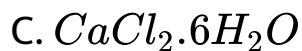
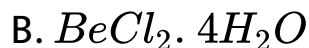
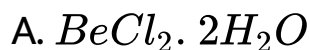
Answer: D



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Mcq Hotspot More Than One Correct Type

1. Which of the following correctly indicate the formula of halides of alkaline earth metals-

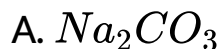


Answer: A::C



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2. The compounds of sodium which are used in textile industry are-



Answer: A::C



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3. Which of the following pairs of elements have similar properties-

A. Be, Cs

B. K, Cs

C. Sr, Rb

D. Be, Al

Answer: B::D



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4. The chlorides which are soluble in pyridine are -

A. LiCl

B. CsCl

C. NaCl

D. $BeCl_2$

Answer: A::D



Watch Video Solution

5. The gases in which magnesium burns are-

A. CO_2

B. N_2O

C. N_2

D. SO_2

Answer: A::B::C::D



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6. Which of the following oxides have rock salt structure with coordination number 6: 6-

A. MgO

B. CaO

C. SrO

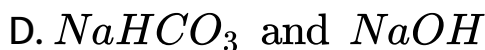
D. BeO

Answer: A::B::C



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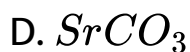
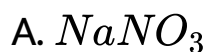
7. Which of the following pairs of compounds cannot exist in aqueous solution -



Answer: C::D



8. The compounds which on heating do not form oxides are -



Answer: A::B



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9. Which of the following pairs of elements will give super oxides and peroxides respectively when heated with excess of air -

A. *K, Br*

B. *Na, Rb*

C. K, Rb

D. Na, Ba

Answer: C::D



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10. Which of the following do not respond to flame test -

A. Be

B. Mg

C. KO_2

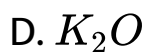
D. Sr

Answer: A::B



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11. Which of the following compounds is paramagnetic



Answer: A::D



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12. Which of the following are incorrect -

A. soda ash: Na_2CO_3

B. pearl ash : Cu_2CO_3

C. bone ash : K_2CO_3

D. baking soda : $NaHCO_3$

Answer: B::D



Watch Video Solution

13. Which ions of water are replaced by sodium ion when hard water is passed through zeolite (hydrated sodium aluminium silicate)-

A. H^+



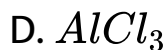
Answer: B::C



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14. The compounds which are soluble in organic solvents are-



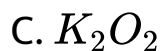
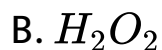


Answer: C::D



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15. The compounds formed when potassium superoxide reacts with water are -



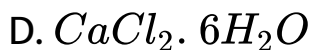
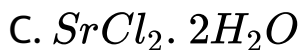
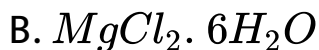
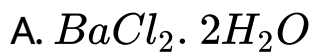
D. O_2

Answer: A::B::D



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16. Which of the following hydrated salts undergo hydrolysis on heating -



Answer: B::D



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17. Which of the following compounds are extensively used as drying agents -

A. anhydrous $CaCl_2$

B. $Mg(ClO_4)_2$

C. BeC

D. $Ca(OH)_2$

Answer: A::B



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18. Each of the following compounds react with water but which of these liberate the same gas -

A. Na

B. Na_2O_2

C. KO_2

D. NaH

Answer: A::D



19. Polarisability of LiCl is higher than that of NaCl.

With respect to this, which of the following statements are true -

A. melting point of LiCl is less than that of NaCl

B. LiCl is sparingly soluble in organic solvents

C. LiCl dissociates to a greater extent in water than NaCl

D. conductivity of molten LiCl is less than that of NaCl

Answer: A::D



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20. Which of the following statements are correct

A. electronegativity of alkali metals decreases with increase in atomic number

B. lithium is the lightest metal

C. alkali metals are strong reducing agents

D. Oelectronegativity of alkali metals ranges from 1.0 to 0.7

Answer: B::C::D



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21. Which of the following statements are incorrect about the hydrates of alkali metals-

A. conduct electricity in their molten states

B. these compounds act as oxidising agents

C. these compounds dissolve in water to liberate

H_2 gas

D. these compounds are covalent in nature

Answer: B::D



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22. Which of the following statements are correct about the ionic solids KI and CaO-

A. lattice enthalpy of CaO is greater than that of KI

B. KI is soluble in benzene

C. melting point of CaO is high

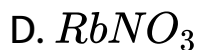
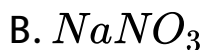
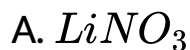
D. melting point of KI is high

Answer: A::B::C



View Text Solution

23. The compounds which do not form NO_2 on undergoing thermal decomposition are -



Answer: B::C::D



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24. Metals are identified by their standard reduction potential, enthalpy of fusion and atomic size. The alkali metals are identified by their-

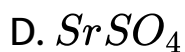
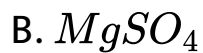
- A. high boiling point
- B. high negative standard reduction potential
- C. high density
- D. greater atomic size

Answer: B::D



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25. Which of the following sulphates easily dissolve in water



Answer: A::B



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26. The properties of beryllium nitride which are different from the nitrides of other alkaline earth metals are-

A. its volatility

B. its covalent nature

C. unable to undergo hydrolysis

D. its ionic nature

Answer: A::B



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27. Which of the following options are correct for RbO_2^-

- A. it is a peroxide
- B. it is diamagnetic
- C. it is a superoxide
- D. it is paramagnetic

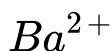
Answer: C::D



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28. Which of the following statements are correct for the alkaline earth metals -

A. hydration enthalpy of Sr^{2+} is less than that of



B. $CaCO_3$ undergoes decomposition at a higher

temperature than $BaCO_3$

C. $Ba(OH)_2$ is a stronger base than $Mg(OH)_2$

D. $SrSO_4$ is more soluble in water than $CaSO_4$

Answer: B::C



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29. Which of the following statements are correct about the alloy formed by sodium and potassium

- A. it is used in Lassaigne's test
- B. it is liquid at ordinary temperature
- C. it is used in specially designed thermometers
- D. it is used as a coolant in nuclear reactors

Answer: B::C::D

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30. Which of the following statements are incorrect -

A. $BeCl_2$ molecule is linear in the gaseous state

B. calcium hydride is known as hydrolith

C. carbides of both beryllium and calcium react with water to form acetylene

D. oxides of both Be and Ca are amphoteric in nature

Answer: C::D



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Exercise Very Short Type Questions

1. Which alkali metal ion has the highest polarising power?

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2. What are the common oxidation states exhibited by group-1 and group-2 metals respectively?

 [Watch Video Solution](#)

3. Name the alkali metals which form superoxides when heated with excess oxygen.

 [Watch Video Solution](#)

4. Which one is lightest and which one is heaviest of all the metals?

 [Watch Video Solution](#)

5. What is the composition of the white powder obtained when metallic magnesium is burnt in air?

 [Watch Video Solution](#)

6. Name two metals of group-2 which do not impart any colour to the flame.



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7. Which alkali metal cannot be stored in kerosene?



[Watch Video Solution](#)

8. Which alkali metal is used as a scavenger in metallurgy to remove O_2 and N_2 gases ?



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9. Which Gr-2 metal carbide reacts with water to produce methane?



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10. In aqueous solution, which alkali metal ion has the lowest mobility?



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11. Which is the most abundant alkaline earth metal in the earth's crust?



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12. Name one biologically important complex formed by a group-2 metal.

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13. Which alkali metal ion forms a stable complex with 18-crown-6

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14. Which alkaline earth metal is largely used as a light weight construction metal?

 [Watch Video Solution](#)

15. Which alkaline earth metal forms an organometallic compound known as Grignard reagent?



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16. Which alkali and alkaline earth metals are radioactive in nature?



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17. The salts of which alkali metal are commonly hydrated?

 [Watch Video Solution](#)

18. Which alkali metal acts as the strongest reducing agent in aqueous solution?

 [Watch Video Solution](#)

19. Which is the least stable alkali metal carbonate?

 [Watch Video Solution](#)

20. What is baryta water?

 [Watch Video Solution](#)

21. Which alkaline earth metal hydroxide is most soluble in water?

 [Watch Video Solution](#)

22. Which alkaline earth metal imparts crimson colour to flame?

 [Watch Video Solution](#)

23. BeO is covalent but still it has high melting point- why?

 [Watch Video Solution](#)

24. What is anhydron?

 [Watch Video Solution](#)

25. Which alkaline earth metal carbonate can be kept only in an atmosphere of CO_2 ?

 [Watch Video Solution](#)

26. Which alkaline earth metal chloride is used as a desiccant in the laboratory?



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27. The basic strength of which alkali metal hydroxide is the highest?



Watch Video Solution

28. Which alkaline earth metal hydroxide is amphoteric in nature?



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29. How will you distinguish between $Ba(OH)_2$ and $Be(OH)_2$?

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30. What are the raw materials used for the manufacture of washing soda by Solvay process?

 [Watch Video Solution](#)

31. What is soda ash?

 [Watch Video Solution](#)

 Watch Video Solution

32. Which alkaline earth metal hydroxide and alkali metal carbonate are used for softening of hard water?

 Watch Video Solution

33. What is the formula of Plaster of Paris?

 Watch Video Solution

34. What is dead burnt plaster?





[Watch Video Solution](#)

35. Which alkaline earth metal carbonate is used as an ingredient of chewing gum?



[Watch Video Solution](#)

36. What is fusion mixture?



[Watch Video Solution](#)

37. What is the most abundant source of sodium chloride?

 [Watch Video Solution](#)

38. For which of its chief properties is Plaster of Paris widely used?

 [Watch Video Solution](#)

39. What is used for making black board chalks?

 [Watch Video Solution](#)

40. Which compound is generally used for the detection of CO_2 in the laboratory?



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Exercise Fill In The Blanks

1. _____ has no d-orbital in its valence shell.



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2. _____ reacts with nitrogen to give nitrides.



[Watch Video Solution](#)

3. _____ imparts golden-yellow colour to the flame.



[Watch Video Solution](#)

4. Potassium, on reaction with dioxygen produces _____ .



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5. The outermost electronic configuration of the radioactive alkali metal is _____ .



[Watch Video Solution](#)

6. The bicarbonate salt of _____ does not exist in solid state.

 [Watch Video Solution](#)

7. Ionic conductance of Li^+ ion in aqueous solution is lowest since its extent of _____ is highest.

 [Watch Video Solution](#)

8. _____ ion has maximum polarising power.

 [Watch Video Solution](#)

9. _____ is the most abundant alkali metal in earth's crust.

 [Watch Video Solution](#)

10. The basicity of the alkali metal hydroxides _____ down the group.

 [Watch Video Solution](#)

11. _____ is used as a source of oxygen in submarines, space shuttles and oxygen masks.

 [Watch Video Solution](#)

12. The alkali metals combine with mercury to give



Watch Video Solution

13. The alkali metals exist as _____ lattices having co-ordination number 8.



Watch Video Solution

14. LiI is _____ soluble than KI in ethanol.



Watch Video Solution

 Watch Video Solution

15. K_2CO_3 cannot be produced by Solvay process because _____ does not get precipitated in the aqueous solution.

 Watch Video Solution

16. _____ and _____ do not respond to flame test.

 Watch Video Solution

17. _____ ion exhibits maximum tendency to form complexes.

 [Watch Video Solution](#)

18. Only _____ can displace hydrogen from dilute HNO_3 .

 [Watch Video Solution](#)

19. Common salt gets wet due to presence of _____ as impurity.

 [Watch Video Solution](#)

20. Hydration enthalpy of Mg^{2+} is _____ than that of Ca^{2+} .

 [Watch Video Solution](#)

21. Hydrolysis of calcium carbide produces _____

 [Watch Video Solution](#)

22. The commercial name of _____ is hydrolith.

 [Watch Video Solution](#)

23. $BeCO_3$ is stable only in an atmosphere of



Watch Video Solution

24. Lime water is a transparent aqueous solution of

_____.



Watch Video Solution

25. The second ionisation enthalpy of the alkaline earth metals is _____ than their first ionisation enthalpy.



[Watch Video Solution](#)

26. The melting point of the alkaline earth metals is _____ than that of alkali metals.



[Watch Video Solution](#)

27. _____ is used to prepare Grignard reagents.



[Watch Video Solution](#)

28. Between Ca and Na, _____ is used to dehydrate alcohols.



[Watch Video Solution](#)

29. Among the alkaline earth metals, _____ is most abundant in earth's crust.



[Watch Video Solution](#)

30. Temperature of the mixture of _____ and ice is about $-54^{\circ}C$.



[Watch Video Solution](#)

[Exercise Short Type Questions](#)

1. Lithium fluoride, LiF has the lowest solubility in water among the halides of group-1 metals. Explain.

 [Watch Video Solution](#)

2. The mobilities of alkali metal ions in aqueous solution increases in the order:

$Li^+ < Na^+ < K^+ < Rb^+$. Explain.

 [Watch Video Solution](#)

3. Lithium on being heated in air mainly forms the monoxide and not the peroxide. Why?



[Watch Video Solution](#)

4. Which of the following metals give hydrated salts and why?

1. Li

2. Na

3. K

4. Cs



[Watch Video Solution](#)

5. Which of the following metals give hydrated salts and why?

1. Li

2. Na

3. K

4. Cs



[Watch Video Solution](#)

6. Which of the following metals give hydrated salts and why?

1. Li

2. Na

3. K

4. Cs



[Watch Video Solution](#)

7. Which of the following metals give hydrated salts and why?

1. Li

2. Na

3. K

4. Cs



[Watch Video Solution](#)

8. Which alkali metal has the least density? How does this metal react with nitrogen?



[Watch Video Solution](#)

9. Which out of Na and Li has higher melting point and why?

 [Watch Video Solution](#)

10. Li exhibits certain properties which are different from that of other group-1 elements. Explain.

 [Watch Video Solution](#)

11. Which out of Na and Mg is softer and why?

 [Watch Video Solution](#)

12. Give equations for the reactions that take place when Li, Na and K are heated with excess of oxygen.

 [Watch Video Solution](#)

13. LiCl is covalent while NaCl is ionic why?

 [Watch Video Solution](#)

14. Beryllium chloride hydrate loses no water over P_4O_{10} - why?

 [Watch Video Solution](#)

Watch Video Solution

15. An aqueous solution of $Be(NO_3)_2$ is strongly acidic. Explain.



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16. Magnesium occurs in nature largely as $MgCO_3$ but beryllium never occurs as $BeCO_3$. Explain.



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17. The crystalline salts of alkaline earth metals contain more water of crystallisation than the corresponding alkali metal salts-why?



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18. Out of Na and Mg which one has higher second ionisation enthalpy? Why?



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19. The hydroxides and carbonates of Na and K are readily soluble in water while the corresponding salts

of Mg and Ca are sparingly soluble. Explain.



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20. BeO is insoluble but $BeSO_4$ is soluble in water.

Explain.



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21. BaO is soluble but $BaSO_4$ is insoluble in water

why?



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22. The chloride of a metal is soluble in an organic solvent. The chloride can be $CaCl_2$, $NaCl$, $MgCl_2$, $BeCl_2$.

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23. The halides of beryllium dissolve in organic solvents but those of barium do not. Why?

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24. Which out of $Ca(OH)_2$ and $Mg(OH)_2$ is more soluble in water and why?

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25. $MgCO_3$ is more soluble in water than $CaCO_3$.

Give reason.

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26. Which out of $Mg(OH)_2$ & $Ca(OH)_2$ is a stronger base and why ?

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27. Anhydrous $CaCl_2$ is used as a dehydrating agent- why?

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28. Discuss the biological importance of Ca^{2+} and Mg^{2+} ions.

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29. Discuss the biological importance of Na^+ and K^+ ions.

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30. LiI is more soluble than KI in ethanol. Explain.

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31. MgSO_4 is more soluble in water than SrSO_4 and decomposes at a much lower temperature- why?

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32. The aqueous solution of sodium carbonate is alkaline - why?

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33. K_2CO_3 cannot be prepared by Solvay process - why?

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34. How can pure NaCl be prepared from common impure NaCl?

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35. Why does common salt become wet in rainy season?

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36. With the help of a drop of an indicator solution, how would you know whether a solution consists of Na_2CO_3 or $NaHCO_3$?

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37. The thermal decomposition of $CaCO_3$ is a reversible reaction: $CaCO_3 \rightleftharpoons CaO + CO_2$. How

does this reaction proceed almost to completion during industrial preparation of quicklime?

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38. How can fused calcium chloride be prepared? Give two important uses of it.

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39. State with reactions, what happens when sulphur dioxide is slowly passed in excess through clear lime water.

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40. What happens when- quicklime is heated with silica,

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41. What happens when- hydrated magnesium chloride is heated in presence of ammonium chloride (NH_4Cl).

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42. What do you mean by setting of Plaster of Paris?



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Practice Set

1. Which of the following is less stable thermally-

A. LiF

B. KCl

C. RbF

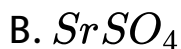
D. CsF

Answer:



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2. Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than its lattice enthalpy ?

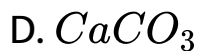
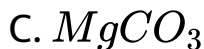
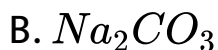
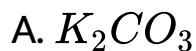


Answer:



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3. On heating which of the following releases CO_2 most easily -



Answer:



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4. The blue colour of potassium solution in liquid ammonia is due to the presence of-

- A. solvated electron
- B. potassium amide
- C. impurities present in potassium
- D. potassium oxide

Answer:



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5. The chloride salt which is soluble in ethanol is-

A. $BeCl_2$

B. $CaCl_2$

C. $SrCl_2$

D. $MgCl_2$

Answer:



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6. Which of the following alkali metals hydroxides is the most basic in nature -

A. $CsOH$

B. KOH

C. LiOH

D. RbOH

Answer:



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7. The correct order of covalent character in the following compounds is-

A. LiCl lt NaCl lt $BeCl_2$

B. $BeCl_2$ gt LiClgt NaCl`

C. NaCl It LiCl It $BeCl_2$

D. $BeCl_2$ It NaCl It LiCl (i

Answer:



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8. Write the basic principles of Solvay process.



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9. All metals become quite opaque when kept in air-
why?





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10. What happens when sodium metal is dropped in water?



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11. What happens when -Sodium metal is heated in free supply of water?



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12. What happens when -Sodium peroxide dissolves in water?

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13. Explain why the elements of group-2 form M^{2+} but not M^{3+} .

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14. Write the composition of gun powder.

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15. Lithium salts are more stable if the anion present in the salt is small-explain.



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16. What is plaster of Paris?



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