

CHEMISTRY

BOOKS - V PUBLICATION

THE *s*- BLOCK ELEMENTS

Question Bank

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



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2. Discuss the general characteristics and gradation in properties of alkaline earth metals.



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3. The group 1 metals of the periodic table of elements are collectively called alkali metals. Alkali metals are never found free in nature. Give reason.



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4. Find the oxidation state of sodium in Na_2O_2



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5. Explain why Na is less reactive than K?



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6. Compare alkali metals and alkaline earth metals with respect to ionisation enthalpy, basicity of oxides and solubility of hydroxides.



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7. Lithium shows similarities in properties with Magnesium. Give any two similarities of Lithium Magnesium



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8. Explain why alkali and alkaline earth metals cannot be obtained by chemical reduction methods?



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9. Why are potassium and caesium, rather than lithium used in photoelectric cells?



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10. 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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11. Beryllium and magnesium do not give colour to flame whereas other alkaline earth metals do so, why?



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12. Discuss the various reactions that occur in the solvay process.



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



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14. Li_2CO_3 decomposes at a lower temperature whereas Na_2CO_3 at higher temperature.why?



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15. Compare the solubility and thermal stability of the following compounds of the alkali metals with those of alkaline earth metals

(a) nitrates

(b) carbonates

(c) sulphates:



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16. Starting with NaCl how would you proceed to prepare

Na_2CO_3 ?



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17. What happens when quick lime is heated with silica



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18. Describe two important uses of each of the following.

(i) Caustic soda (ii) Sodium carbonate (iii)

Quick lime.



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19. Draw the structure of (i) BeCl_2 (vapour) (ii) BeCl_2 (solid).



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20. The s-block of periodic table constitutes alkali metals and alkaline earth metals. The hydroxides and carbonates of sodium and potassium are more soluble than that of corresponding salts of Magnesium and Calcium.Explain.



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21. Describe the importance of the following (i) Lime stone (ii) Cement (iii) Plaster of paris.



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



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



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24. Monovalent Na^+ , K^+ ions and divalent Ca^{2+} , Mg^{2+} ions are found in large proportions in biological fluids. What are the major roles of these Na and K ions in our body ?



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25. What happens when (i) sodium metal is dropped in water (ii) sodium metal is heated in free supply of air (iii) sodium peroxide dissolves in water.



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26. Comment on the following observation

The mobility of alkali metal ions in aqueous solution is $Li^+ < Na^+ < K^+ < Rb^+$



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27. why alkali metals are prepared by electrolysis of their fused halides



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28. Write balanced equations for reactions between

(a) Na_2O_2 and water

(b) K_2O and water

(c) Na_2O and CO_2



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29. How would you explain? BaO is soluble but $BaSO_4$ is insoluble in water.



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30. Which of the alkali metals is having least melting point?

A. Na

B. K

C. Rb

D. Cs

Answer: D



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31. Which of the following gives hydrated salts. Li, Na, K, or Cs?

A. Li

B. Na

C. K

D. Cs

Answer: A



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32. which of the most thermally stable carbonate among $MgCO_3, CaCO_3, SrCO_3$ and $BaCO_3$?

A. MgCO_3

B. CaCO_3

C. SrCO_3

D. BaCO_3

Answer: D



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33. Certain aspects regarding compounds of sodium are given below. Match them properly.

(##VPU_HSSC_{HE}X_{IC}10_E02₀₀₁ – Q01##)



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34. Lithium and Magnesium belong to 1st and 2nd groups in the periodic table. They resemble each other in many respects.(i) Name such relationship.(ii) Give any one similarity between Li and Mg.



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35. A student is doing an experiment in the laboratory using sodium. Suddenly, a piece of sodium falls into liquid ammonia.

(a) What changes can you observe in liquid ammonia?

(b) What is the reason for the change?

(c) If the solution is kept for a long time it is changed into bronze colour. Why?



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36. Alkali metals can react with water to form hydroxides which are alkalies:

(a) Which of the following will react more vigorously with water? *K*, *Ca*, *Na* and *Mg*.

(b) Arrange the following in the increasing order of basicity. Sustain your observations.

NaOH, *LiOH*, *RbOH*, *KOH*, *CsOH*.



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37. We use soaps and detergents for washing clothes. But in olden days people were using washing soda for that purpose. Can washing soda be used to clean clothes in all types of water. Justify your answer.

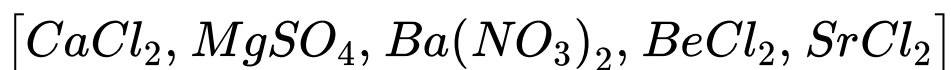


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38. You are given conc. HCl and salts of some alkaline earth metals and directed to conduct flame test and to detect the cation present in

each salt.

(a) Can you detect all the cations which are given here by this method?



(b) Justify your answer.

(c) What is the mechanism of this test?



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39. By passing chlorine gas through a colourless solution, we get bleaching powder.

(a) What happens if CO_2 is passed instead of

Cl_2 ?

(b) When CO_2 is passed in excess, what changes can you observe?



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40. A magnesium compound which is used as purgative in medicine, is converted to MgO on strong heating.

(a) Identify the compound.

(b) Mention any other use of the compound.



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41. There are two compounds of sodium whose formulae are (anhydrous form) different by one H – atom. Both the compounds can be prepared by the same process. One compound can be used for washing purpose and other one can be used in fire extinguishes.

(a) Identify the compounds?

(b) Name the method of preparation?



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42. (a) Why does Al dissolve both in acidic and basic solutions?



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43. Complete the following

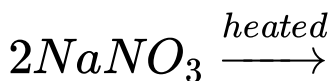
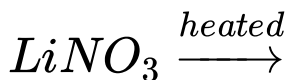
(i) $\text{Li} + \text{N}_2$ gives



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44. (a) What happens when alkali metals dissolved in ammonia?

(b) Complete the reaction,



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45. (a) Name the chief factor responsible for the anomalous behaviour of lithium.



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46. Give reasons. (i) Solutions of alkali metals in liquid ammonia are blue in colour.



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47. Why Li_2CO_3 decomposes at lower temperature whereas Na_2CO_3 at higher temperature?



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48. Sodium metal is kept under kerosene.

Explain?



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49. A piece of magnesium is burned in air.

Which are the reactants here ?



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50. BeCl_2 can be easily hydrolysed. Explain?



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51. Why does magnesium has a higher ionization enthalpy than sodium?



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52. Why is it that ' BeSO_4 ' and ' MgSO_4 ' are soluble but ' BaSO_4 ' is insoluble in water?



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53. What is magnesia cement? Give its composition?



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54. Beryllium exhibits some similarities with aluminium. Write three such properties.



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55. The energy released during the addition of an electron to an isolated neutral atom is called electron gain enthalpy.

a) Explain how electron gain enthalpy differ from electronegativity.

b) The second ionisation enthalpy of an element is always greater than the first ionisation enthalpy. Give reason.



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56. Why lithium forms only lithium oxide and not peroxide or superoxide?



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57. Out of 'KOH' and 'NaOH', which is stronger base and why?



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



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59. Why an aqueous solution of sodium carbonate is alkaline?



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60. What is fly ash?



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61. compound of calcium is used in hospitals for setting fracture of bones.(i) Write the name and formula of the above compound. (ii) What is dead burnt plaster?



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62. Give the chemical formula of dolomite and carnallite?





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63. Sodium fire in the laboratory should not be extinguished by pouring water. Why?



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64. Give reasons. (i) Solutions of alkali metals in liquid ammonia are blue in colour.



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65. Why does table salt get wet in rainy season?



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66. The alkali metals and their salts impart characteristic colour to an oxidising flame. Give the flame colour of Na and K.



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67. The s-block of periodic table constitutes alkali metals and alkaline earth metals. Write the chemical name of the following: (i) Caustic soda (ii) Baking soda (iii) Slaked lime (iv) Milk of lime



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68. Why, alkali metals and the alkaline earth metals do not occur in free state?



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69. What is the use of 'KO₂' in oxygen masks?



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70. Standard solution of sodium hydroxide cannot be prepared by weighing, why?



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71. Compare the properties of alkali metals and alkaline earth metals?



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72. In olden days people were using washing soda for washing clothes,

i. What is washing soda?



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73. Li' and 'Mg' of groups I and II have certain similarities.

'(##VPU_HSS_CHE_XI_C10_E02_041_Q01##)'

Compare their.

a. atomic radii b. electronegativities

c. reaction with 'O₂'



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74. Lithium is group 1 element. It shows some similarities with group 2 element magnesium.

What is the reason for this relationship?

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75. How will you prepare $Ca(OH)_2$ and $CaCO_3$ from quick lime (CaO)?

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76. Cement is an important building material. Explain the manufacture of cement.

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77. The group 1 metals of the periodic table of elements are collectively called alkali metals. Write the general electronic configuration of alkali metals



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78. Mg and Li have similar properties due to

A. same elm ratio

B. same electron affinity

C. same group

D. same ionic potential

Answer: D



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79. Photoelectric effect is maximum in

A. Cs

B. Na

C. K

D. Li

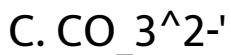
Answer: A



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80. A sodium salt of unknown anion when treated with ' MgCl_2 ' gives white precipitate only on boiling. The anion is

A. SO_4^{2-}



Answer: B



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81. One mole of magnesium nitride on reaction with excess of water gives

A. one mole of ammonia

B. one mole of nitric acid

C. two moles of ammonia

D. two moles of nitric acid

Answer: C



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82. Which of the following is not a Mg ore?

A. Gypsum

B. Magnesite

C. Dolomite

D. Carnallite

Answer: A



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83. Among the alkali metals, cesium is the most reactive because

A. its incomplete shell is nearest to the nucleus.

B. it has a single electron in the valence shell.

C. it is the heaviest alkali metal

D. the outermost electron is more loosely bound than the outermost electron of the other alkali metals.

Answer: D



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84. The ionic mobility in aqueous solution is maximum for K^+ , Rb^+ , Li^+ , Na^+

A. K^+

B. Rb^+

C. Li^+

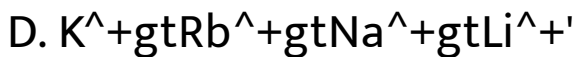
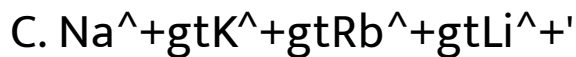
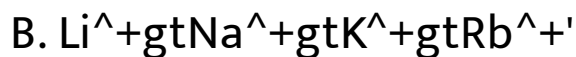
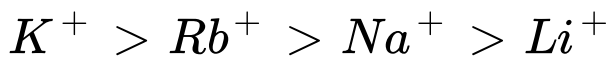
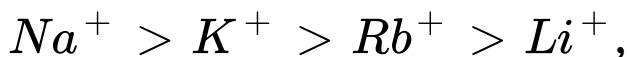
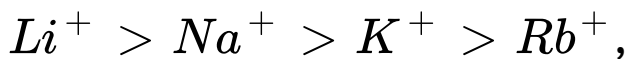
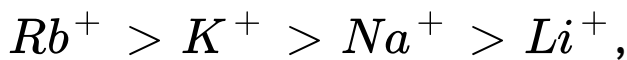
D. Na^+

Answer: B



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85. The correct order of mobility of the alkali metal ions in aqueous solution is :



Answer: A



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86. Pick out the statement(s) which is (are) not true about the diagonal relationship. of *Li* and *Mg*.(A). Polarising powers of Li^+ and Mg^{2+} are almost same. (B). Like *Li*, *Mg* decomposes water very fast. (C). *LiCl* and *MgCl₂* are deliquescent (D). Like *Li*, *Mg* readily reacts with liquid bromine at ordinary temperature. : A and D, B and C, Only B, Only A

A. A and D

B. B and C

C. Only B

D. Only A

Answer:



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87. Which of the following exists in polymeric form? $AlCl_3$, $BeCl_2$, SiC , B_2H_6

A. 'AlCl₃'

B. BeCl₂'

C. SiC

D. B₂H₆'

Answer: B



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88. The increasing order of ionic character of

CsF, *LiI*, *NaBr* and *KCl* is :

NaBr < *KCl* < *LiI* < *CsF*,

$CsF < KCl < NaBr < LiI,$

$LiI < NaBr < KCl < CsF,$

$LiI < KCl < CsF < NaBr$

A. $NaBr < KCl < LiI < CsF$

B. $CaF < KCl < NaBr < LiI$

C. $LiI < NaBr < KCl < CsF$

D. $LiI < KCl < CsF < NaBr$

Answer: C



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89. Compared with alkaline earth metals, the alkali metals exhibit. : .

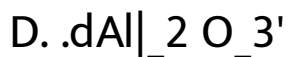
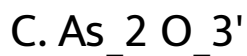
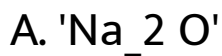
- A. Smaller ionic radii
- B. Higher boiling points
- C. Greater hardness
- D. Lower ionisation enthalpies

Answer: D



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90. Which is maximum basic in the following?



Answer: A



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91. Micro-cosmic salt is : $Ca_2HPO_4 \cdot 2H_2O$,

$(NH_4)_2HPO_4 \cdot 2H_2O$,

$Na(NH_4)HPO_4 \cdot 4H_2O$),, None of these

A. $Ca_2HPO_4 \cdot 2H_2O$ '

B. $(NH_4)_2HPO_4 \cdot 2H_2O$ '

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

D. None of these

Answer: C



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92. Which has the maximum lattice energy?

A. RbF

B. CsF

C. NaF

D. KF

Answer: C



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93. The affinity of sodium with water is used in : drying of alcohols, drying of ammonia, drying benzene, drying most of the compounds

A. drying of alcohols

B. drying of ammonia

C. drying benzene

D. drying most of the compounds

Answer: C



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94. Which is maximum reactive towards water?

A. Li

B. K

C. Na

D. Rb

Answer: A



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95. Which has the maximum electropositive character? Cu Cs Ba Cr

A. Cu

B. Cs

C. Ba

D. Cr

Answer: B



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96. The electronic configuration of a metal 'M' is $1s^2 2s^2 2p^6 3s^1$. The formula of its oxide would be: MO M₂O M₂O₃ MO₂

A. MO

B. M₂O

C. M₂O₃

D. MO₂

Answer: B



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97. The basic character of the oxides,

MgO , SrO , K_2O , NiO and CS_2O

increases in the order:

$MgO > SrO > K_2O > NiO > CS_2O$,

$CS_2O < K_2O < MgO < SrO \leq NiO$,

$NiO < MgO < SrO < K_2O < CS_2O$,

$K_2O < NiO < MgO < Sr_2O < CS_2O$

A. $MgO > SrO > K_2O > NiO > CS_2O$

B. $CS_2O < K_2O < MgO < SrO \leq NiO$

C. $NiO < MgO < SrO < K_2O < CS_2O$

D. $K_2O \cdot NiO \cdot MgO \cdot Sr_2O \cdot CS_2 \cdot O'$

Answer: C



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98. Which of the following are arranged in increasing order of solubilities ?



A. CaCO_3 lt KHCO_3 lt NaHCO_3 '

B. NaHCO_3 lt KHCO_3 lt CaCO_3 '

C. ' KHCO_3 lt NaHCO_3 lt CaCO_3 '

D. ' CaCO_3 lt NaHCO_3 lt KHCO_3 '

Answer: D



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99. The compound insoluble in acetic acid is ?

A. calcium oxide

B. calcium carbonate

C. calcium oxalate

D. calcium hydroxide

Answer: C



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100. Which of the following is not an ore of lithium? Petalite, Triphylite , Albite , Spodumene

A. Petalite

B. Triphylite

C. Albite

D. Spodumene

Answer: C



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101. Down's process is used for the extraction
of Na Li Ba Mg

A. Na

B. Li

C. Ba

D. Mg

Answer: A



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102. Which of the following is not an important constituent of cement? C a O' Al₂ O₃ 'MgO'. Na₂ O'

A. CaO

B. Al_2O_3

C. MgO

D. Na_2O

Answer: D



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103. All the following substances react with water. The pair which gives the same gaseous

product is: K' and 'KO₂' 'Na' and 'Na₂O₂' Ca'
and 'CaH₂' Ba' and 'BaO₂'

A. K' and 'KO₂'

B. 'Na' and 'Na₂O₂'

C. Ca' and 'CaH₂'

D. Ba' and 'BaO₂'

Answer: C



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104. Solvay process is used for the manufacture of NaOH' 'Na₂CO₃' NH₃' NaCl'

A. NaOH'

B. 'Na₂CO₃'

C. NH₃'

D. NaCl'

Answer: B



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105. Magnesium is present in

A. Haemoglobin

B. Chlorophyll

C. Vitamin 'B_(12)'

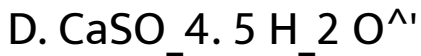
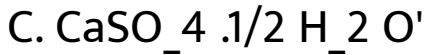
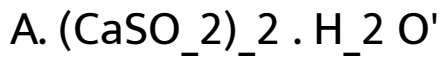
D.

Answer: B



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106. Plaster of Paris is chemically

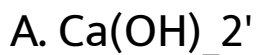


Answer: A



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107. Quicklime is :



B. CaCO_3

C. CaO

D. CaSO_4

Answer: C



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108. Slaked lime reacts with chlorine to give

CaCl_2 CaO CaOCl_2 CaCO_3

A. CaCl_2

B. CaO'

C. CaOCl₂'

D. CaCO₃'

Answer: C



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109. Suspension of slaked lime 'in' water is called Washing of lime Quicklime Milk of lime
None of these

A. Washing of lime

B. Quicklime

C. Milk of lime

D. None of these

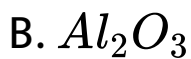
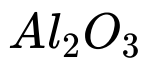
Answer: C



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110. Which of the following is not present in portland cement?

SiO



Answer: D



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