CHEMISTRY

BOOKS - MODERN PUBLICATION

CHEMISTRY (KANNADA ENGLISH)

CHEMISTRY OF s-BLOCK ELEMENTS

Multiple Choice Questions Level I

1. Which of the following electronic configurations in the outermost two subshells is characteristic of the alkali metals ?

A. $(n-1)s^2p^6ns^2$

B. $(n-1)s^2p^6d^{10}ns^1$

C. $(n-1)s^2p^6ns^2np^1$

D. $(n-1)s^2p^6ns^1$

Answer: D

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2. The solutions of alkali metals in liquid ammonia exhibit each of the following properties except :

A. are coloured solutions

B. are paramagnetic

C. are reversible in nature

D. behave as strong oxidising agents.

Answer: D

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3. Which alkali metal can be preferably used in photoelectric cells ?

A. Li

B. Na

C. Rb

D. Cs

Answer: D

4. Which of the following statements is not true regarding alkali metals?

A. The alkali metals exhibit only +1 oxidation state.

B. The alkali metals have high chemical reactivity

C. Since the alkali metals have good tendency to lose s-electron, they behave as strong oxidising agents.

D. The alkali metals dissolve in liquid ammonia to give blue coloured solutions.

Answer: C

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5. The Li^+ ion, though smallest in size is the poorest conductor of electricity as compared to other alkali metal ions in water. This is due to :

A. its smaller ionic radius in water

B. its low electropositive character

C. its larger degree of hydration

D. its high melting and boiling points.

Answer: C

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6. Explain the diagonal relationship between LIthium and Magnesium

A. sodium

B. beryllium

C. magnesium

D. boron

Answer: C

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7. Which of the following elements can form only monoxide and not peroxide and superoxide ?

A. Li

B. Na

C. K

D. all the three

Answer: A

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8. The blue colour of liquid ammonia solutions of alkali metals is mainly due to :

A. coloured cations

B. ammoniated cations

C. ammoniated electrons

D. colour of liquid ammonia

Answer: C

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9. Which of the following sodium halides has the highest melting point ?

A. NaF

B. NaCl

C. NaBr

D. NaI

Answer: A

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10. The group I elements form hydroxides, which are :

A. strongly acidic

B. strongly basic

C. weakly acidic

D. neutral

Answer: B

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11. Which one of the following alkali metals is the most abundant in the earth's crust ?

A. Li

B. Na

C. Rb

D. Cs

Answer: B

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12. Which of the following alkali metal ions in aqueous solution is the best conductor of electricity ?

A. Cs^+

B. Rb^+

C. K^+

D. Li^+

Answer: A

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13. The most electropositive metal is :

A. Ba

B. Rb

C. Na

D. Cs

Answer: D

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14. Alkali metals do not occur free in nature because:

A. they are very reactive

B. they are volatile

C. their amount in earth's crust is very small

D. they are strong oxidising agents

Answer: A

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15. Which property is not characteristic of alkali metal halides ?

A. High melting point

B. Electrical conductivity in molten state

C. Lack of colour

D. Slight solubility in water

Answer: D

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16. Which of the following alkali metal reacts with water least vigorously ?

A. Sodium

B. Potassium

C. Lithium

D. Cesium

Answer: C

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17. The metallic lustre exhibited by sodium is explained by :

A. diffusion of sodium ions

B. oscillation of loose electrons

C. excitation of free electrons

D. existence of body centred cubic lattice.

Answer: B

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18. Solvay process is used for the manufacture of :

A. NaOH

B. Na_2CO_3

C. NH_3

D. NaCl

Answer: B

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19. Baking soda is :

A. $Na_2CO_3 \cdot 10H_2O$

B. Na_2CO_4

C. $NaHCO_3$

D. $CaCO_3$

Answer: C

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20. Potassium is kept in :

A. kerosene

B. water

C. ammonia

D. alcohol

Answer: D

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21. In the lime kiln of Solvay process, lime stone is burnt to get carbon dioxide. Lime stone is :

A. NH_4HCO_3

B. $CaCO_3$

C. Na_2CO_3

D. $NaHCO_3$

Answer: B

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22. Potassium occurs mainly in nature as :

A. KBr

B. $KHCO_3$

C. KNO_3

D. K_2SO_4

Answer: C

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23. Sodium hydroxide may be prepared by any of the following methods except :

A. Nelson cell

B. Castner Kellner cell

C. Solvay process

D. Bell process

Answer: C

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24. The main process for the manufacture of sodium carbonate is :

A. Solvay process

B. Lead chamber process

C. Down process

D. Nelson cell

Answer: A

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25. When sodium burns in excess of air, the compound formed is :

A. Sodium suboxide

B. Sodium peroxide

C. Sodium oxide

D. Sodium superoxide

Answer: B

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26. Which of the following is an ore of potassium ?

A. Cryolite

B. Bauxite

C. Dolomite

D. Carnallite

Answer: D

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27. In the preparation of sodium carbonate (Na_2CO_3), from solvay process which of the following is used :

A. slaked lime

B. quick lime

C. lime stone

D. sodium hydroxide

Answer: C

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28. Which of the following compounds is used in Gun powder?

A. $NaNO_3$

B. KNO_3

C. $LiNO_3$

D. $Mg(NO_3)_2$

Answer: B

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29. Washing soda has the formula :

A. $Na_2CO_3 \cdot 7H_2O$

B. $Na_2CO_3 \cdot 10H_2O$

C. $Na_2CO_3 \cdot 3H_2O$

D. Na_2CO_3

Answer: B

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30. Sodium metal cannot be stored under :

A. benzene

B. kerosene

C. alcohol

D. toluene

Answer: C

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31. The useful by products obtained in the Solvay process of manufacture of Na_2CO_3 are :

A. quick lime, CO_2

B. $NaHCO_3$, NH_4Cl

C. NH_4Cl solution, quick lime

D. $NaHCO_3, CO_2$

Answer: C

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32. Sodium is used in nuclear reactor as :

A. a moderator

B. a coolant

C. a reducing agent

D. an oxidising agent

Answer: C

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

A. $Na^+ > K^+ > Rb^+ > Li^+$

B. $K^+ > Rb^+ > Na^+ > Li^+$

C. $Rb^+ > K^+ > Na^+ > Li^+$

D. $Li^+ > K^+ > Na^+ > Rb^+$

Answer: C

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34. Among the following the least thermally stable is :

A. K_2CO_3

B. Na_2CO_3

C. $BaCO_3$

D. Li_2CO_3

Answer: D

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35. Which of the following alkali metal is expected to melt if the room temperature rises to $30^{\circ} C$?

A. Na

B. K

C. Rb

D. Cs

Answer: D

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36. Which of the following alkali metal reacts with water least vigorously ?

A. Li

B. Na

C. K

D. Cs

Answer: A

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37. Which of the following configuration corresponds to an alkaline earth metal ?

A. $[Ne]3s^2 3p^1$

B. $[Ar]3d^{10}4s^2$

C. $[Kr]5s^1$

D. $[Ar]4s^2$

Answer: D

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38. Choose the incorrect statement.

A. Alkaline earth metals are good reducing agents.

B. Beryllium resembles aluminium closely in its properties, though it belongs to a different group.

C. Beryllium is more electropositive than magnesium.

D. The electronegativities of alkaline earth metals decrease with atomic numbers.

Answer: C

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39. Which of the following alkaline earth metal ion has lowest ionic mobility in aqueous solutions ?

A. Be^{2+}

B. Mg^{2+}

C. Ba^{2+}

D. Sr^{2+}

Answer: A

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40. Which of the following elements cannot give characteristic colouration to the flame ?

A. Cs

B. Ca

C. Mg

D. Sr

Answer: C

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41. Which one of the following properties is more applicable to alkaline earth metals compared with alkali metals ?

A. Greater ionic radii

B. Lower ionization energies

C. Lesser basic hydroxides

D. Lower electronegativities

Answer: C

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42. Which of the following is not true ?

A. 1.The alkaline earth metals always form dipositive ions

B. 2.The compounds of alkaline earth metals are less soluble in water than the corresponding alkali metals.

C. 3.The hydrides of alkaline earth metals are reducing agents

D. 4.In the solid state, $BeCl_2$ exists as linear molecule.

Answer: D

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43. Beryllium carbide reacts with water to give :

A. acetylene

B. ethane

C. ethylene

D. methane

Answer: D

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44. Which of the following alkaline earth metal ions has smallest heat of hydration ?

A. Mg^{2+}

B. Ca^{2+}

C. Sr^{2+}

D. Ba^{2+}

Answer: D

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45. Which one of the following alkaline earth metals has some similarities with aluminium ?

A. Ca

B. Be

C. Sr

D. Ba

Answer: B

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46. Beryllium chloride can be prepared by passing chlorine vapours over heated mixture of :

A. BeO and CO_2

B. $BeCO_3$ and C

C. BeO and C

D. $Be(OH)_2$ and C

Answer: C

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47. Which of the following hydroxide of alkaline earth metals is least basic ?

A. $Be(OH)_2$

B. $Ba(OH)_2$

C. $Mg(OH)_2$

D. $Ca(OH)_2$

Answer: A

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48. The hydration energy of Mg^{2+} is greater than that of :

A. Al^{3+}

B. Na^{+}

C. Be^{2+}

D. Mg^{3+}

Answer: B

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49. The least soluble alkaline earth metal sulphate is :

A. $MgSO_4$

B. $CaSO_4$

C. $SrSO_4$

D. $BaSO_4$

Answer: D

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50. $Be(OH)_2$ in alkali solutions forms :

A. Be^{2+} and H_2O

B. $\left[Be(OH)_4\right]^{2-}$

C. BeO

D. $\left[Be(OH)_6\right]^{4-}$

Answer: B

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51. Among the alkaline earth metals, the element forming predominantly covalent compounds is :

A. Ba

B. Ca

C. Sr

D. Be

Answer: D

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52. Which of the following is not an important constituent of cement ?

A. CaO

B. Al_2O_3

C. MgO

D. Na_2O

Answer: D

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53. Magnesium is present in :

A. Haemoglobin

B. Chlorophyll

C. Vitamin B_{12}

D. Ascorbic acid

Answer: B

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54. Quick lime is

A. $Ca(OH)_2$

B. $CaCO_3$

C. CaO

D. $CaSO_4$

Answer: C

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55. Which of the following is not an ore of calcium ?

A. Gypsum

B. Dolomite

C. lime stone

D. Corundum

Answer: D

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56. During the electrolysis of calcium chloride for the extraction of calcium, calcium fluoride is also added. The calcium fluoride :

A. lowers the melting point of calcium chloride

B. behaves as a medium

C. acts as an anode

D. make the flow of current fast

Answer: A

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57. Magnesium reduces SO_2 and gives :

A. SO_3

B. H_2SO_4

C. Mg S_2O_3

D. S

Answer: D

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58. Which of the following is an ore of magnesium ?

A. Asbestos

B. Cinnabar

C. Cryolite

D. Glauber's salt

Answer: A

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59. Slaked lime reacts with chlorine to give :

A. $CaCl_2$

B. CaO

C. $CaOCl_2$

D. $CaCO_3$

Answer: C

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60. Calcium is obtained by :

A. Electrolysis of solution of $CaCl_2$ in water

B. Electrolysis of molten $CaCl_2$

C. Heating calcium oxide carbon

D. By nitrating calcium carbide.

Answer: B

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61. The oxides of Ca, Sr and Ba are :

A. Basic

B. Acidic

C. Amphoteric

D. Neutral

Answer: A

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62. Suspension of slaked lime in water is called :

A. Washing of lime

B. Quick lime

C. Milk of lime

D. None of these

Answer: C

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63. Which of the following is an ore of calcium ?

A. Epsom salt

B. Gypsum

C. Sylvine

D. Asbestos

Answer: B

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64. Dead burnt plaster is obtained by heating Plaster of Paris. It is :

A. $CaSO_4 \cdot \frac{1}{2}H_2O$

B. $CaSO_4 \cdot 2H_2O$

C. $CaSO_4$

D. $CaHCO_3$

Answer: C

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65. Anhydrous $MgCl_2$ can be prepared by heating $MgCl_2 \cdot 6H_2O$:

A. 1. in a current of dry HCl

B. 2. with carbon

C. 3. with lime

D. 4. until it fuses

Answer: A

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66. The difference of water molecules in gypsum and Plaster of Paris is :

A. $\frac{5}{2}$

B. 2

C. $\frac{1}{2}$

D. $1\frac{1}{2}$

Answer: D

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67. Magnesium burns in air to give :

A. MgO

B. Mg_3N_2

C. $MgCO_3$

D. MgO and Mg_3N_2

Answer: D

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68. Increasing order of thermal stability is :

A. $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$

B. $K_2CO_3 < MgCO_3 < CaCO_3 < BeCO_3$

C. $BeCO_3 < MgCO_3 < K_2CO_3 < CaCO_3$

D. $MgCO_3 < BeCO_3 < CaCO_3 < KCO_3$

Answer: A

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69. In the reaction :

$\text{Quick lime} \xrightarrow{H_2O} X \xrightarrow{Cl_2} Y$

X and Y are respectively :

A. $Ca(OH)_2, CaCl_2$

B. $CaCl_2, Ca(HCO_3)_2$

C. $Ca(OH)_2, CaOCl_2$

D. $CaCO_3, CaOCl_2$

Answer: C

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70. In which of the following the hydration energy is higher than the lattice energy ?

A. $MgSO_4$

B. $RaSO_4$

C. $SrSO_4$

D. $BaSO_4$

Answer: A

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Multiple Choice Questions Level Ii

1. The ionisation enthalpy values of alkali metals indicate that lithium should be poorest reducing agent because of its high ionization energy. However, it is the strongest reducing agent among alkali metals. This may be explained because of:

A. low sublimation energy of lithium

B. reducing power of an element is reverse to its ionisation potential.

C. high heat of hydration of lithium

D. high lattice energy of lithium compounds

Answer: C

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2. Which of the following elements can form stable nitride ?

A. Na

B. Mg

C. Cs

D. Ca

Answer: B

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3. Which of the following statements is not true regarding beryllium chloride ?

A. 1.In solid state, beryllium chloride exists in the form of chain structure.

B. 2.It readily dissolves in water and gets hydrolysed to form basic solution.

C. 3.In vapour state, it exists as dimer with bridged structure.

D. 4.Above 1200 K, it has linear structure.

Answer: B

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4. Which of the following metals dissolve in sodium hydroxide with the evolution of hydrogen?

A. Beryllium

B. Magnesium

C. Calcium

D. Strontium

Answer: A

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5. Which of the following statement regarding difference between lithium and other alkali metals is incorrect ?

A. Lithium is much softer than other alkali metals

B. Unlike other alkali metals, it forms Li_2O mainly in air.

C. Lithium nitrate on heating gives Li_2O whereas other alkali metal nitrates decompose to give corresponding nitrites.

D. LiF and Li_2O are comparatively less soluble in water than corresponding compounds of other alkali metals.

Answer: A

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6. On dissolving moderate amount of sodium metal in liquid ammonia at low temperature, which one of the following does not occur ?

A. Blue coloured solution is obtained

B. Na^+ ions are formed in the solution

C. Liquid ammonia becomes good conductor of electricity

D. Liquid ammonia remains diamagnetic.

Answer: D

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7. Castner Kellner cell is used for the manufacture of :

A. Sodium hydroxide

B. Sodium carbonate

C. Magnesium chloride

D. Sodium metal

Answer: A

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8. Carnallite is :

A. $KCl.\ MgCl_2.6H_2O$

B. Na_3AlF_6

C. $Ca_2B_6O_{11}.2H_2O$

D. $Ca_2Mg_2Si_8O_{22}(OH)_2$

Answer: A

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9. Plaster of paris is

A. $(CaSO_4)_2.\ H_2O$

B. $CaSO_4.2H_2O$

C. $CaSO_4.\ H_2O$

D. $CaSO_4.5H_2O$

Answer: A

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10. $MgSO_4.7H_2O$ on heating above 503 K gives :

A. $MgSO_4.\ H_2O$

B. $MgSO_4$

C. $MgO + SO_3$

D. $Mg + SO_2 + SO_3$

Answer: C

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11. Soda ash has the chemical formula :

A. Na_2CO_3

B. $NaHCO_3$

C. NaOH

D. Na_2O

Answer: A

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12. Which of the following metals forms its amide when NH_3 is passed over the metal at $300^\circ C$?

A. Lead

B. Potassium

C. Magnesium

D. Zinc

Answer: B

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13. Mortar is a mixture of water, sand and :

A. quick lime

B. lime stone

C. slaked lime

D. gypsum

Answer: C

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14. In the Solvay process, the reaction :

$$2NH_4Cl + Ca(OH)_2 \rightarrow CaCl_2 + 2NH_3 + 2H_2O$$

takes place in :

A. carbonation tower

B. saturation tank

C. ammonia recovery tower

D. filtration tank

Answer: C

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15. Slaking is the process of adding water to :

A. $Ca(OH)_2$

B. $CaCl_2$

C. CaO

D. $CaCO_3$

Answer: C

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16. Epsom salt has the following uses except :

A. as a puragative in medicines

B. in dyeing and tanning industries

C. as a food preservative

D. a catalyst in the manufacture of sulphuric acid.

Answer: C

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17. Causticization is a process in which :

A. NaOH is manufactured by treating sodium carbonate with lime

B. soap is prepared by treating vegetable oils with caustic soda

C. sodium carbonate is prepared by Solvay process

D. petroleum is treated with caustic soda before fractional distillation.

Answer: A

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18. Electrolysis of molten NaCl leads to the formation of :

A. sodium and oxygen

B. sodium and hydrogen

C. hydrogen and oxygen

D. sodium and chlorine

Answer: D

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19. The most common cations in biological systems are :

A. Na^+ and Mg^{2+}

B. Ca^{2+} and Mg^{2+}

C. Na^+ and K^+

D. K^+ and Mg^{2+}

Answer: C

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20. Which of the following pair cannot exist in solution?

A. $NaHCO_3$ and $NaOH$

B. Na_2CO_3 and $NaOH$

C. Na_2CO_3 and HCl

D. $NaHCO_3$ and HCl

Answer: A

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21. Which of the following compound, on reaction with NaOH and Na_2O_2 gives yellow colour ?

A. $Cr(OH)_3$

B. $Zn(OH)_2$

C. $Al(OH)_3$

D. None

Answer: A

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22. Which of the following statement is not correct ?

A. Epsom salt on heating to 423 K loses six water molecules

B. Dolomite is $CaCO_3.MgCO_3$

C. Aluminium chloride exists as polymer.

D. Quick lime is CaO

Answer: C

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23. For two ionic solids KI and CaO, identify the wrong statement among the following :

A. Lattice energy of CaO is much higher than that of KI

B. KI is soluble in benzene

C. CaO has high m.p

D. KI has high m.p

Answer: D

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24. The correct sequence of increasing covalent character is represented by

A. $LiCl < NaCl < BeCl_2$

B. $BeCl_2 < LiCl < NaCl$

C. $NaCl < LiCl < BeCl_2$

D. $BeCl_2 < NaCl < LiCl$

Answer: C

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25. Which one of the following is not dissolved in dilute hydrochloric acid ?

A. MnS

B. ZnS

C. $BaCO_3$

D. $BaSO_4$

Answer: D

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26. Sesquoxides of alkali metals may be represented by the formula :

A. M_2O_5

B. M_2O_3

C. MO_2

D. M_2O_2

Answer: B

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27. Among KO_2, AlO_2^-, BaO_2 and NO_2^+, unpaired electron is present in :

A. NO_2^+ and BaO_2

B. KO_2 and AlO_2^-

C. KO_2 only

D. BaO_2 only

Answer: C

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28. Which of the following oxides is most acidic in nature ?

A. BeO

B. MgO

C. CaO

D. BaO

Answer: A

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29. Which of the following does not react with water even under red hot condition ?

A. Na

B. Be

C. Ca

D. K

Answer: D

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30. The reducing power of a metal depends on various factors. Suggest the factor which makes Li, the strongest reducing agent in aqueous solution.

A. Sublimation enthalpy

B. Ionisation enthalpy

C. Hydration enthalpy

D. Electron-gain enthalpy

Answer: C

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31. Which of the metal carbonates is most stable thermally?

A. $MgCO_3$

B. $CaCO_3$

C. $SrCO_3$

D. $BaCO_3$

Answer: D

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32. Which of the carbonates given below is unstable in air and is kept in CO_2 atmosphere to avoid decomposition.

A. $BeCO_3$

B. $MgCO_3$

C. $CaCO_3$

D. $BaCO_3$

Answer: A

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33. Which of the following metal hydroxide is the least basic ?

A. $Mg(OH)_2$

B. $Ca(OH)_2$

C. $Sr(OH)_2$

D. $Ba(OH)_2$

Answer: A

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34. Among the following metal halides, the one which is soluble in ethanol is

A. $BeCl_2$

B. $MgCl_2$

C. $CaCl_2$

D. $SrCl_2$

Answer: A

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35. Which of the following Group 2 metal hydroxides is soluble in sodium hydroxide ?

A. $Be(OH)_2$

B. $Mg(OH)_2$

C. $Ca(OH)_2$

D. $Ba(OH)_2$

Answer: A

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36. In the synthesis of sodium carbonate, the recovery of ammonia is done by treating NH_4Cl with $Ca(OH)_2$. The by-product obtained in this process is

A. $CaCl_2$

B. NaCl

C. NaOH

D. $NaHCO_3$

Answer: A

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37. When sodium is dissolved in liquid ammonia, a solution of deep blue colour is obtained. The colour of the solution is due to

A. ammoniated electron

B. sodium ion

C. sodium amide

D. ammoniated sodium ion

Answer: A

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38. Suspension of slaked lime in water is called :

A. lime water

B. quick lime

C. milk of lime

D. aqueous solution of slaked lime

Answer: C

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39. Which of the following elements does not form hydride by direct heating with dihydrogen ?

A. Be

B. Mg

C. Sr

D. Ba

Answer: A

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40. The order of decreasing ionisation enthalpy in alkali metals is

A. $Na > Li > K > Rb$

B. $Rb < Na < K < Li$

C. $Li > Na > K > Rb$

D. $Li < Na < K < Rb$

Answer: C

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41. Amongst fluorides of alkali metals, the lowest solubility of LiF in water is dur to

A. Ionic nature of lithium fluoride

B. High lattice enthalpy

C. High hydration enthalpy for lithium ion

D. Low ionisation enthalpy of lithium atom

Answer: B

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42. By adding gypsum to cement

A. 1. setting time of cement becomes less

B. 2. setting time of cement increases

C. 3. colour of cement becomes light

D. 4. shining surface is obtained

Answer: B

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43. Dead burnt plaster is

A. $CaSO_4$

B. $CaSO_4 \cdot \frac{1}{2}H_2O$

C. $CaSO_4 \cdot H_2O$

D. $CaSO_4 \cdot 2H_2O$

Answer: C

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44. A substance which gives brick red flame and breaks down on heating to give oxygen and a brown gas is

A. Magnesium nitrate

B. Calcium nitrate

C. Barium nitrate

D. Strontium nitrate

Answer: B

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45. Which of the following statements is true about $Ca(OH)_2$?

A. It is used in the preparation of bleaching powder.

B. It is a light blue solid

C. It does not possess disinfectant property

D. It is used in the manufacture of cement.

Answer: A

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46. The mixture of $MgCl_2$ and MgO is called

A. Sorrel's cement

B. Portland cement

C. Alum

D. Magnesium oxychloride

Answer: A

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47. Which of the following is radioactive alkali metal ?

A. Fr

B. Ra

C. At

D. Rn

Answer: A

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48. The following compounds have been arranged in order of their increasing thermal stabilities. Identify the correct order :

$K_2CO_3(I), MgCO_3(II), CaCO_3(III), BeCO_3(IV)$

A. $I < II < III < IV$

B. $IV < II < III < I$

C. $IV < II < I < III$

D. $II < IV < III < I$

Answer: B

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49. The alkaline earth metal which imparts apple green colour to bunsen flame when introduced in it in the form of its chloride is

A. calcium

B. strontium

C. magnesium

D. barium

Answer: D

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50. Which two of the following salts are used for preparing iodized salt? (i)KIO_3 (ii)KI (iii)I_2 (iv)HI

A. I and II

B. I and III

C. II and IV

D. III and IV

Answer: A

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51. Which of the following is formed by the action of water on Na_2O_2?

A. H_2

B. O_2

C. N_2

D. CO_2

Answer: B

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52. Which one of the following processes is used for the manufacture of calcium?

A. Reduction of CaO with carbon

B. Reduction of CaO with hydrogen

C. Electrolysis of a mixture of anhydrous $CaCl_2$ and KCl

D. Electrolysis of molten $Ca(OH)_2$

Answer: C

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53. RbO_2 is

A. Peroxide and paramagnetic

B. Peroxide and diamagnetic

C. Superoxide and paramagnetic

D. Superoxide and diamagnetic

Answer: C

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54. Which of the following on thermal decomposition yields a basic as well as acidic oxide?

A. $KClO_3$

B. Na_2CO_3

C. $NaNO_3$

D. $CaCO_3$

Answer: D

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55. The alkali metals form salts like hydrides by the direct synthesis at elevated temperature. The thermal stability of these hydrides decreases in which of the following order ?

A. $CsH > RbH > KH > NaH > LiH$

B. $KH > NaH > LiH > CsH > RbH$

C. $NaH > LiH > KH > RbH > CsH$

D. $LiH > NaH > KH > RbH > CsH$

Answer: D

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56. Which of the following metals has the largest abundance in the earth's crust ?

A. Aluminium

B. Calcium

C. Magnesium

D. Sodium

Answer: A

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57. Propertyof alkaline earthmetals that increases with their atomic number is

A. Electronegativity

B. Solubility of their hydroxides in water

C. Solubility of their sulphates in water

D. Ionisation enthalpy

Answer: B

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58. Which of the following alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy?

A. $SrSO_4$

B. $CaSO_4$

C. $BeSO_4$

D. $BaSO_4$

Answer: C

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59. The increasing order of the density of alkali metals

A. $Li < K < Na < Rb < Cs$

B. $Li < Na < K < Rb < Cs$

C. $Cs < Rb < Na < K < Li$

D. $Cs < Rb < K < Na < Li$

Answer: A

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60. Which of the following oxides is not expected to react with sodium hydroxide ?

A. CaO

B. SiO_2

C. BeO

D. B_2O_3

Answer: A

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61. The correct order of reducing character of alkali metals is

A. $Rb < K < Na < Li$

B. $Li < Na < K < Rb$

C. $Na < K < Rb < Li$

D. $Rb < Na < K < Li$

Answer: C

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62. Which one of the following on hydrolysis, gives the corresponding metallic hydroxide, H_2O_2 and O_2 ?

A. Li_2O

B. Na_2O_2

C. NaO_2

D. Na_2O

Answer: C

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63. Which one of the following order presents the correct sequence of the increasing basic nature of the given oxides?

A. $Al_2O_3 < MgO < Na_2O < K_2O$

B. $MgO < K_2O < Al_2O_3 < Na_2O$

C. $Na_2O < K_2O < MgO < Al_2O_3$

D. $K_2O < Na_2O < Al_2O_3 < MgO$

Answer: A

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64. The product obtained on heating $LiNO_3$ will be

A. $Li_2O + NO_2 + O_2$

B. $Li_3N + O_2$

C. $Li_2O + NO + O_2$

D. $LiNO_2 + O_2$

Answer: A

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65. Choose the incorrect statement in the following

A. 1. BeO is almost insoluble but $BeSO_4$ is soluble in water

B. 2. BaO is soluble but $BaSO_4$ is insoluble in water

C. 3. LiI is more soluble than KI in ethanol

D. 4. Both Li and Mg form solid hydrogen carbonates

Answer: D

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66. Which of the following compound has the lowest melting point ?

A. $CaCl_2$

B. $CaBr_2$

C. CaI_2

D. CaF_2

Answer: C

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67. Among the following compounds, the one that gets hydrolysed to form metallic hydroxide, hydrogen peroxide and oxygen is

A. Na_2O

B. Na_2O_2

C. Li_2O

D. KO_2

Answer: D

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68. The reaction between sodium and water can be made less vigorous by

A. lowering the temperature

B. adding a little alcohol

C. amalgamating sodium

D. adding a little acetic acid

Answer: C

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69. Which one of the alkali metals, forms only, the normal oxide, M_2O on heating in air ?

A. Rb

B. K

C. Li

D. Na

Answer: C

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70. A metal M readily forms water soluble sulphate MSO_4, water insoluble hydroxide $M(OH)_2$ and oxide MO which becomes inert on heating. The hydroxide is soluble in NaOH. The metal is :

A. Be

B. Mg

C. Ca

D. Sr

Answer: A

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71. Which of the following process is used in the extraction of metallurgy of magnesium ?

A. fused salt electrolysis

B. salt reduction

C. aqueous solution electrolysis

D. thermite reduction

Answer: A

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72. KO_2 (potassium superoxide) is used in oxygen cylinders in space and submarines because it :

A. 1. absorbs CO_2 and increases O_2 content

B. 2. eliminates moisture

C. 3. absorbs CO_2

D. 4. produces ozone

Answer: A

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73. Identify the correct order of acidic strengths of CO_2, CuO, CaO and H_2O :

A. $CaO < CuO < H_2O < CO_2$

B. $H_2O < CuO < CaO < CO_2$

C. $CaO < H_2O < CuO < CO_2$

D. $H_2O < CO_2 < CaO < CuO$

Answer: A

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74. The substance not likely to contain $CaCO_3$ is :

A. dolomite

B. a marble statue

C. calcined gypsum

D. sea shells

Answer: C

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75. Solubilities of carbonates decrease down the magnesium group due to decrease in :

A. entropy of solution formation

B. lattice energies of solids

C. hydration energies of cation

D. inter-ionic attraction

Answer: C

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Multiple Choice Questions Level Iii

1. Which one of the following orders presents the correct sequence of the increasing basic nature of the given oxides ?

A. $Na_2O < K_2O < MgO < Al_2O_3$

B. $K_2O < Na_2O < Al_2O_3 < MgO$

C. $Al_2O_3 < MgO < Na_2O < K_2O$

D. $MgO < K_2O < Al_2O_3 < Na_2O$

Answer: C

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2. What is the best description of the change that occurs when $Na_2O(s)$ is dissolved in water ?

A. Oxide ion accepts sharing in a pair of electrons

B. Oxide ion donates a pair of electrons

C. Oxidation number of oxygen increases

D. Oxidation number of sodium decreases

Answer: A

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3. The product obtained on heating $LiNO_3$ will be

A. $Li_2O + NO_2 + O_2$

B. $Li_3N + O_2$

C. $Li_2O + NO + O_2$

D. $LiNO_2 + O_2$

Answer: A

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4. Which of the following on thermal decomposition yields a basic as well as acidic oxide?

A. NH_4NO_3

B. $NaNO_3$

C. $KClO_3$

D. $CaCO_3$

Answer: D

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5. The metal that cannot be obtained by electrolysis of an aqueous solution of its salts is

A. Ag

B. Ca

C. Cu

D. Cr

Answer: B

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6. Which of the following alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy?

A. $CaSO_4$

B. $BeSO_4$

C. $BaSO_4$

D. $SrSO_4$

Answer: B

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Recent Examination Questions

1. The characteristic not related to alkali metal is `

A. Their ions are isoelectronic with noble gases

B. Low melting point

C. Low electronegativity

D. High ionisation energy

Answer: D

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2. The reaction between sodium and water can be made less vigorous by

A. lowering the temperature

B. adding a little alcohol

C. amalgamating sodium

D. adding a little acetic acid

Answer: C

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3. Alkali metals have negative reduction potential and hence they behave as :

A. oxidising agents

B. Lewis bases

C. reducing agents

D. electrolytes

Answer: C

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4. A metallic oxide reacts with water to from its hydroxide, hydrogen peroxide and also liberates oxygen. The metallic oxide could be

A. CaO

B. KO_2

C. Li_2O

D. Na_2O_2

Answer: B

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5. The pair of compound which cannot exist together in solution is

A. $NaHCO_3$ and Na_2CO_3

B. $NaHCO_3$ and $NaOH$

C. Na_2CO_3 and $NaOH$

D. $NaHCO_3$ and H_2O

Answer: B

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6. Mg is an important component of

A. Haemoglobin

B. Chlorophyll

C. ATP

D. Florigen

Answer: B

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