CHEMISTRY

BOOKS - A2Z CHEMISTRY (HINGLISH)

S BLOCK ELEMENTS (GROUP 13 - 14)

General Characterstics Pysical And Chemical Properties Of Alkali Metals

1. Which is not a $s-$ block element ?

A. $[Ar]4s^2 3d^{10} 4p^6 5s^1$

B. $1s^2 2s^2 2p^1$

C. $[He]2s^2 2p^6 3s^1$

D. None of these

Answer: B

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2. Sodium metal cannot be stored under

A. benzene

B. kerosene

C. alcohol

D. toluene

Answer: C

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3. A fire of lithium , sodium and potassium can be extinguished by

A. H_2O

B. Nitrogen

C. CO_2

D. Asbestos blanket

Answer: C

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4. Sodium cannot be extracted by the electrolysis of brine solution because:

A. sodium liberated reacts with water to produce $NaOH + H_2$

B. sodium being more electropositive than hydrogen, H_2 is liberated at cathode and not sodium

C. electrolysis cannot take place with brine soulution

D. none of the above

Answer: B

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5. Which of the following statements is correct for $CsBr_3$?

A. It is a covalent compound

B. It contains Cs^{3+} and Br^- ions

C. It contains Cs^+ and Br_3^- ions

D. It contains Cs^+, Br^- and Br_2 molecule

Answer: C

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6. Sodium chloride imparts a yellow colour to the Bunsen flame .This can be interpreted due to the

A. low ionization potential of sodium

B. photosensitivity of sodium

C. sublimation of metallic sodium to give yellow vapour.

D. emission of excess of enerngy absorbed as a radiation in the visible region

Answer: D

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7. Potassium is kept in

A. Alcohol

B. Water

C. Kerosene

D. Liquid ammonia

Answer: C

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8. Which of the following is not known?

A. K_2O

B. K_2O_2

C. KO_4

D. KO_3

Answer: C

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9. Lithium shows similarities to magnesium in its chemical behaviour because.

A. Similar size, greater electronegativity and similar polarizing power.

B. Similar size, same electronegativity and lower polarizing power

C. Similar size, same electronegativity and similar high polarizing power

D. None of these

Answer: C

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10. Arrange the following compounds in the order of increasing conductance : $HCl, LiCl, NaCl, KCl.$

A. $LiCl > NaCl > KCl$

B. $KCl > NaCl > LiCl$

C. $NaCl > KCl > LiCl$

D. $LiCl > KCl > NaCl$

Answer: B

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11. Alkali metals are characterised by

A. good conductor of heat and electricity

B. high oxidation potentials

C. high melting points

D. solubility in liquid ammonia

Answer: C

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12. Which of the following is not correct about the solution when moderate amount of sodium metal is dissolved in liquid ammonia at low temperature ?

A. Na^+ ions are produced in solution

B. We get a blue coloured solution

C. the solution acts as a good conductor of electricity

D. Liquid ammonia remains diamagnetic

Answer: D

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13. K, Ca and Li metals may be arranged in the decreasing order of their standard electrode potentials as

A. K, Ca, Li

B. Li, K, Ca

C. Li, Ca, K

D. Ca, Li, K

Answer: B

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14. Which property of sodium is being used in street lights?

A. It shows photoelectric effect

B. It has low melting point

C. Sodium atom emits photons in the yellow region of visible spectrum, due to electrically stimulated transitions

D. Sodium vapours show golden colour

Answer: C

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15. A highly pure dilute solution of sodium in liquid ammonia:

A. shows blue colour

B. do not exhibit electrical conductivity

C. produces sodium amide

D. produces hydrogen gas

Answer: A

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16. Which of the following is not correct ?

A. $2Li_2O \xrightarrow[673K]{\text{heat}} Li_2O_2 + 2Li$

B. $2K_2O \xrightarrow[673K]{\text{heat}} K_2O_2 + 2K$

C. $2Na_2O \xrightarrow[673K]{\text{heat}} Na_2O_2 + 2Na$

D. $2Rb_2O \xrightarrow[673K]{\text{heat}} Rb_2O_2 + 2Rb$

Answer: A

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17. The alkali metals have low melting point. 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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18. Alkali metals react with water vigorously to form hydroxides and dihydrogen. Which of the following alkali metals reacts with water least vigorously ?

A. Li

B. Na

C. K

D. Cs

Answer: A

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19. Sodium burns in dry air to give :

A. Na_2O

B. Na_2O_2

C. NaO_2

D. Na_3N

Answer: B

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20. Excess of Na^+ ions in our system causes

A. High BP

B. Low BP

C. Diabetes

D. Anaemia

Answer: A

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21. As compared to lithium, sodium reacts quickly with water because

A. Its molecular weight is less

B. It is stronger electronegative

C. It is stronger electropositive

D. It is a metal

Answer: C

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22. The decreasing order of the second ionization potentials of K, Ca and Ba is

A. $K > Ca > Ba$

B. $Ca > Ba > K$

C. $Ba > K > Ca$

D. $K > Ba > Ca$

Answer: A

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23. The alkali metal that reacts with nitrogen directly to form nitride is

A. Li

B. Na

C. K

D. Rb

Answer: A

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24. Which of the following increases in magnitude as the atomic number of alkali metals increases?

A. Electronegativity

B. First ionisation potential

C. Ionic radius

D. Melting point

Answer: C

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25. Alkaline earth metals are denser than alkali metals, because metallic bonding in alkaline earth metals is

A. Stronger

B. Weaker

C. Volatile

D. Not present

Answer: A

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26. The metallic luster exhibited by sodium is explained by

A. Diffusion of sodium ions

B. Oscillations of lose electrons

C. Excitation of free protons

D. Existence of body centered cubic lattice

Answer: B

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27. If Na is heated in presence of air, it forms

A. Na_2CO_3

B. Na_2O_2

C. Na_2O

D. Both (b) and (c)

Answer: D

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28. A substance X is a compound of an element of group $1A$ the substance X gives a violet colour in flame test, X is

A. $LiCl$

B. $NaCl$

C. KCl

D. None of these

Answer: C

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29. The order of basicity of hydroxides of alkali metals is

A. $NaOH > KOH > RbOH$

B. $NaOH > RbOH > KOH$

C. $RbOH > KOH > NaOH$

D. $RbOH > NaOH > KOH$

Answer: C

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30. What happens when sodium metal is heated to a temperature $350^{\circ}C$ in excess of dry air containing carbon dioxide gas ?

A. Na_2O_2 is formed.

B. Na_2O is formed

C. First Na_2O_2 is formed which then converts into Na_2CO_3

D. First NaO_2 is formed which then converts into Na_2CO_3

Answer: C

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31. Potassium superoxide (KO_2) is used in space capsuled, submarined, and breathing masks, because it is

A. diamagnetic in nature

B. high melting compound

C. helpful in removing CO_2 and producing O_2

D. unstable compound.

Answer: C

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32. Which of the following has density greater than water?

A. Li

B. Na

C. K

D. Rb

Answer: D

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33. KO_2 is used in oxygen cylinders in space and submarines because it

A. absorbs CO_2 and increases O_2 content

B. eliminate moisture

C. absorbs CO_2

D. produces O_2

Answer: A

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34. Cs^+ ions impart violet colour to Bunsen flame. This is due to the fact that the emitted radiations are of

A. high energy

B. lower frequencies

C. longer wavelength

D. zero wave number

Answer: A

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35. A solution of sodium metal in liquid ammonia is strongly reducing due to the presence of

A. sodium atoms

B. sodium hydride

C. sodium amide

D. solvated electrons

Answer: D

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

A. Blue coloured solution is obtained

B. Na^+ ions are formed in the solution

C. Liquid NH_3 becomes good conductor of electricity

D. Liquid ammonia remains diamagnetic

Answer: D

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37. Amongst $LiCl, RbCl, BeCl_2$ and $MgCl_2$, the compounds whith the greatrest and the least ionic character respecitely are :

A. $LiCl, RbCl$

B. $RbCl, BeCl_2$

C. $RbCl, MgCl_2$

D. $MgCl_2, BeCl_2$

Answer: B

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38. The ionization enthalpies of the alkali metals decrease down the group from Li to Cs because :

A. The effect of increasing size outweighs the increasing nuclear charge.

B. The outermost electron is very well screened from the nuclear charge.

C. Both (a) and (b).

D. none of the above

Answer: C

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39. Which of the following has the highest reactivity towards water?

A. Na

B. Rb

C. Li

D. K

Answer: B

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40. Sodium is heated in excess of air, free from CO_2 at $350^\circ C$ to form X. X absorbs CO_2 and forms Na_2CO_3

and Y. $'X'$ and $'Y'$ are respectively :

A. Na_2O and O_2

B. Na_2O_2 and O_2

C. NaO_2 and O_2

D. Na_2O_2 and O_3

Answer: B

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41. Which of the following oxides is formed when potassium metal is burnt in excess air?

A. KO_3

B. K_2O

C. K_2O_2

D. KO_2

Answer: D

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42. The elements of group 1 are called alkali metals because

A. Their oxides form acidic solutions on treating with water

B. Their peroxides form alkalies solution on treating with water

C. Their oxides and hydroxides form alkalies solutions on treating with water

D. Their hydroxides form acidic solution on treating with water

Answer: C

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43. Which of the following alkali metals has the biggest tendency of the half reaction

$M_{(g)} \rightarrow M_{(aq)} + e^-$

A. Sodium

B. Lithium

C. Potassium

D. Cesium

Answer: B

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44. Which of the following forms the most basic hydroxide ?

A. Cu

B. Al

C. Na

D. Zn

Answer: C

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45. The word 'alkali' is used for alkali metals indicates

A. Ash of the plants

B. Metallic nature

C. Silvery lustre

D. Active metal

Answer: A

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46. The order of melting point of chlorides of alkali metals is :

A. $LiCl > NaCl > KCl > CsCl$

B. $LiCl > NaCl > KCl > CsCl$

C. $NaCl > KCl > CsCl > LiCl$

D. $LiCl > NaCl > CsCl > KCl$

Answer: C

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Compound Of Alkali Metals

1. The colour of the precipitate produced by adding $NaOH$ solution to $HgCl$ is

A. Yellow

B. Black

C. Brown

D. White

Answer: A

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2. Brine is chemically

A. conc. Solution of Na_2CO_3

B. conc. Solution of Na_2SO_4

C. conc. Solution of $NaCl$

D. cons. Solution of alum

Answer: C

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3. Washing soda is _____ .

A. Na_2CO_3

B. $Na_2CO_3.H_2O$

C. $Na_2CO_3.7H_2O$

D. $Na_2CO_3.10H_2O$

Answer: D

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4. A colourless salt gives violet colour to Bunsen flame and also turns moistured litmus paper blue. It is :

A. Na_2CO_3

B. KNO_3

C. K_2CO_3

D. $Cu(OH)_2$

Answer: C

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5. Which of the following statements about $LiCl$ and $NaCl$ is correct ?

A. $LiCl$ has higher melting point than $NaCl$

B. $LiCl$ dissolves in water whereas $NaCl$ does not

C. $LiCl$ would ionize in water more than $NaCl$

D. Fused $LiCl$ would be less conducting than fused $NaCl$

Answer: D

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6. The pair of compounds which cannot exist in solution is:

A. $NaHCO_3$ and $NaOH$

B. Na_2CO_3 and $NaHCO_3$

C. Na_2CO_3 and $NaOH$

D. $NaHCO_3$ and $NaCl$

Answer: A

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7. Sodium carbonate reacts with SO_2 in aqueous medium to give

A. $NaHSO_3$

B. Na_2SO_3

C. $NaHSO_4$

D. Na_2SO_4

Answer: A

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8. $NaOH$ is prepared by the electrolysis of :

A. aqueous solution of sodium chloride with platinum electrodes

B. molten sodium chloride with graphite anode and iron cathodes

C. sodium carbonate with platinum electrodes

D. sodium carbonate with nickel electrodes

Answer: A

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9. Sodium nitrate decomposes above-$800^{\circ} C$ to give

A. N_2

B. O_2

C. NO_2

D. Na_2O

Answer: A

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10. When $NaCl$ is dissolved in water the sodium ion becomes

A. oxidized

B. reduced

C. hydrolysed

D. hydrated

Answer: D

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11. The reagent commonly used to determine hardness of water titrimetrically is :

A. Oxalic acid

B. Disodium of EDTA

C. Sodium citrate

D. Sodium thiosulphate

Answer: B

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12. A and B are two salts. A with dilute HCl and B with con. H_2SO_4 react to give reddish brown vapours, hence A and B respectively are :

A. $NaBr, NaNO_3$

B. $NaNO_3, NaBr$

C. $NaBr, NaNO_2$

D. $NaNO_2, NaBr$

Answer: D

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13. On heating sodium carbonate, _____ and CO_2 are formed.

A. CO_2

B. water vapour

C. carbon dioxide $+$ water vapour

D. none of these

Answer: D

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14. Which of the following is known as soda ash?

A. $Na_2CO_3.H_2O$

B. $NaOH$

C. $NaHCO_3$

D. Na_2CO_3 (anhydrous)

Answer: D

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15. In Down's Process, for manufacture of sodium metals, $CaCl_2$ is added to NaCl in order to

A. Improve the electrical conduction

B. Increase the temperature of electrolysis

C. Bring down the melting temperature

D. Stabilize the metallic sodium

Answer: C

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16. The pair of compounds which can exist together in aqueous solution is

A. Na_2CO_3 and $NaHCO_3$

B. $K_2Cr_2O_7$ and $NaOH$

C. $NaHCO_3$ and $NaOH$

D. none of these

Answer: A

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17. What would your observe if excess of dilute $NaOH$ solution is added and shaken with an aqueous solution of aluminium chloride ?

A. A permanent white precipitate is formed immediately

B. No change at first but a white precipitate is formed on standing

C. A white precipitate is obtained which later dissolves

D. A green precipitate which turns red on standing in air

Answer: C

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18. Sodium dichormate on heating with coke yields :

A. sodium carbonate

B. sodium chromite

C. sodium chromate

D. chromic anhydride

Answer: A

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19. Sodium thiosulphate, $Na_2S_2O_3.5H_2O$ is used in photography to

A. Reduce silver bromide to metallic silver

B. Convert metallic silver to silver salt

C. Remove undecomposed $AgBr$ as a soluble silver thiosulphate complex

D. Remove unreduced silver

Answer: C

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20. Which one out of the $NaOH$ and KOH is a better absorber of CO_2 ?

A. $NaOH$

B. KOH

C. both absorb CO_2 equally

D. cannot be predicted

Answer: B

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21. In which of the following precesses, fused sodium hydroxide is electrolysed at a $333^{\circ}C$ temperature for extraction of sodium

A. Castner's process

B. Down's process

C. Cyanide process

D. Both (b) and (c)

Answer: A

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22. Which of the following is neither deliquescent nor efflorscent and is used for wool washing ?

A. $NaOH$

B. KOH

C. $NaHCO_3$

D. $Na_2CO_3.\ NaCO_3.2H_2O$

Answer: D

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23. In the Castner's process for the extration of sodium, the anode is made of ..... metal

A. Copper

B. Iron

C. Sodium

D. Nickel

Answer: C

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24. In Down's cell (for production of sodium), graphite anode is used because

A. graphite has no reaction with sodium

B. graphite has no reaction with chlorine

C. graphite can easily he fashioned in circular form

D. none of these

Answer: B

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25. At higher temperature sodium metal reacts with alumina to give a sodium compound $'X'$. $'X'$ is dissolved in water and then carbon dioxide gas is passed through it, a compound $'Y'$ is formed. The compound $'X'$ and $'Y'$ are respectively

A. Na_2O_2 and Na_2CO_3

B. Na_2O and Na_2CO_3

C. Na_2O_2 and $NaAlO_2$

D. $NaAlO_2$ and Na_2CO_3

Answer: B

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26. Sodium carbonate can be manufactured by Solvay's process but potassium carbonate cannot be prepared because :

A. K_2CO_3 is more soluble

B. K_2CO_3 is less soluble

C. $KHCO_3$ is more soluble than $NaHCO_3$

D. $KHCO_3$ is less soluble than $NaHCO_3$

Answer: C

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27. What products are formed during the electrolysis of a of a concentrated aqueous solution of sodium chloride ?

I. $Cl_2(g)$, II. $NaOH(aq)$, III. $H_2(g)$.

A. I only

B. I and II only

C. I and III only

D. All of these

Answer: D

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28. Causticisation process is used for the preparation of

A. Caustic soda

B. Caustic potash

C. Baryta

D. Slaked lime

Answer: A

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29. When $NaOH$ crystals are left in open air, they acquire a fluid layer around each crystal as

A. They start melting

B. They absorb moisture from air

C. They react with air to form a liquid compound

D. They absorb O_2 from air

Answer: B

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30. Which of the following is true ?

A. Sodium when heated in excess of excess of oxygen gives sodium oxide

B. Oxidation state of oxygen in KO_2 is -1

C. Sodium amalgam is better reducing agent than hydrogen

D. Sodium nitrate on heating gives nitrogen dioxide.

Answer: C

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31. Based on lattice energy and other considerations, which one of the following alkali metal chloride is expected to have the highest melting point ?

A. $LiCl$

B. $NaCl$

C. KCl

D. $RbCl$

Answer: A

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32. When washing soda is heated.

A. CO is released

B. $O + O_2$ is released

C. O_2 is released

D. Water vapour is released

Answer: D

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33. A metal M reacts with N_2 to give a compound $'A'(M_3N)$. 'A' on heating at high temperature gives back $'M'$ and $'A'$ on reacting with H_2O gives a gas 'B'.'B' turns $CuSO_4$ solution blue on passing through it A and B can be

A. Al and NH_3

B. Li and NH_3

C. Na and NH_3

D. Mg and NH_3

Answer: B

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34. When CO is heated with $NaOH$ under pressure, we get

A. Na_2CO_3

B. $NaHCO_3$

C. $HCOONa$

D. None

Answer: C

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35. Which one of the following salts gives aqueous solution which is weakly basic ?

A. $NaHCO_3$

B. $NaHSO_4$

C. $NaCl$

D. NH_4HCO_3

Answer: A

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36. When dry ammonia gas is passed over heated sodium (out of contact of air) the product forms is

A. Sodium nitrite

B. sodium hydride

C. Sodium amide

D. Sodium azide

Answer: C

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37. Sodium carbonate is prepared by :

A. Solvay's process

B. Kolbe's process

C. Contact process

D. Nessler's process

Answer: A

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38. Certain characteristics lithium differ from those of other alkali metals, the main reason for this is

A. Small size of Li atom and Li^+ ion

B. Extremely high electropositivity of Li

C. Greater hardness of Li

D. Hydration of Li^+ ion

Answer: A

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39. A solid compound $'X'$ on heating gives CO_2 gas and a residue. The residue mixed with water forms $'Y'$. On passing an excess of CO_2 through $'Y'$ in water , a clear solution, $'Z'$ is obtained. On boiling $'Z'$, compound $'X'$ is reformed. The compound $'X'$ is

A. Na_2CO_3

B. K_2CO_3

C. $Ca(HCO_3)_2$

D. $CaCO_3$

Answer: D

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40. On commercial scale, sodium hydroxide is prepared by :

A. Down's process

B. Solvay process

C. Castner-Kellner cell

D. Hall- Heroult process

Answer: C

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General Characterstics Pysical And Chemical Properties Of Alkaline Earth Metals

1. The most electropositive amongst the alkaline earth metals is:

A. Be

B. Mg

C. Ca

D. Ba

Answer: D

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2. Property of the alkaline earth metals that increases with their atomic number is

A. ionisation energy

B. solubility of their hydroxides

C. solubility of their sulphates

D. eletronegativity

Answer: B

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3. Which out of the following statements is not correct for anyhydrous calcium chloride ?

A. It is prepared by heating hydrated calcium chloride above $533K$

B. It is used for drying alcohols and NH_3

C. It is used as a dehydrating agent to control snow and ice on highway and pavements

D. When mixed in concrete, it gives quicker initial setting and improves its strength.

Answer: B

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4. Alkaline earth metal salts are:

A. paramagnetic

B. diamagnetic

C. ferromagnetic

D. all

Answer: B

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

A. two moles of nitric acid

B. one mole of nitric acid

C. two moles of ammonia

D. one mole of ammonia

Answer: C

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6. The correct order regarding the solubility of alkaline earth metal chlorides in water is

A. $BeCl_2 < MgCl_2 < CaCl_2 < SrCl_2 < BaCl_2$

B. $MgCl_2 > CaCl_2 > BeCl_2 > BaCl_2 > SrCl_2$

C. $BaCl_2 > MgCl_2 > CaCl_2 > BeCl_2 > SrCl_2$

D. $BeCl_2 > MgCl_2 > CaCl_2 > SrCl_2 > BaCl_2$

Answer: D

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7. The first ionisation energies of alkaline earth metal are higher than those of the alkali metals. This is because:

A. there is increase in the nuclear charge of the alkaline earth metal

B. there is decrease in the nuclear charge of alkaline earth metal

C. there is no change in the nuclear charge

D. none of these

Answer: A

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8. Amongst the following hydroxides, the one which has the lowest value of K_{sp} is:

A. $Mg(OH)_2$

B. $Ca(OH)_2$

C. $Ba(OH)_2$

D. $Be(OH)_2$

Answer: D

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9. Serveral blocks of magnesium are fixed to the bottom of a ship to

A. prevent action of water and salt

B. prevent puncturing by undersea rocks

C. keep away from the sharks

D. make the ship lighter

Answer: D

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10. Beryllium shows diagonal relationship with aluminum . Which of the following similarity is incorrect?

A. Be_2C like AlC_3 yields methane on hydrolysis

B. Be like Al rendered passive by HNO_3

C. $Be(OH)_2$ like $Al(OH)_3$ is basic

D. Be forms beryllates and Al forms aluminates

Answer: C

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11. A metal M readily forms its sulphate MSO_4 which is watersoluble. It forms its oxide MO which becomes inert on heating. It forms its insoulbe hydroxide $M(OH)_2$ which is soluble in $NaOH$ solution. Then M is

A. Mg

B. Ba

C. Ca

D. Be

Answer: D

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12. The first ionisation potentials (eV) of Be and B respectively are

A. $8.29, 9.32$

B. $9.32, 9.32$

C. $8.29, 8.29$

D. $9.32, 8.29$

Answer: D

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13. The set representing the correct order of the first ionisation potential is

A. $K > Na > Li$

B. $Be > Mg > Ca$

C. $B > C > N$

D. $Ge > Si > C$

Answer: B

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14. Calcium is obtained by the

A. Roasting of limestone

B. Reduction of $CaCl$ with carbon

C. Electrolysis of a solution of $CaCl_2$ in water

D. Electrolysis of molten $CaCl_2$

Answer: D

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15. Which of the following is incorrect ?

A. Mg burns in air releasing dazzling light rich in UV rays

B. $CaCl_2.6H_2O$ when mixed with ice gives freezing mixture

C. Mg cannot form complexes

D. Be can form complexed dur to its very small size.

Answer: C

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16. Compounds of alkaline earth metals are less soluble in water than the corresponding alkali metal salts due to :

A. their high ionisation energy

B. their low electronegativity

C. their low hydration energy

D. their high lattice energy

Answer: D

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17. Which of the following sulphates is useful in diagnosing stomach or duodenal ulcers?

A. Be

B. Ca

C. Sr

D. Ba

Answer: D

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18. Lithopone is a mixture of

A. barium sulphate and zinc sulphide

B. barium sulphide and zinc sulphide

C. calcium sulphate and zinc sulphide

D. calcium sulphide and zinc sulphide

Answer: A

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19. The decreasing order of the second ionization potentials of K, Ca and Ba is

A. $Ca > Ba > K$

B. $Ba > KCa$

C. $K > Ca > Ba$

D. $K > Ba > Ca$

Answer: C

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20. Li shows the diagonal relationship with

A. Mg

B. B

C. Al

D. C

Answer: A

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21. Mg burns in CO to produce

A. MgO_2

B. $MgCO_3$

C. $MgO + CO$

D. $MgO + C$

Answer: D

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22. Halides of alkaline earth metals form hydrates such as $MgCl_2.6H_2O, CaCl_2.6H_2O, BaCl_2.2H_2O$ and $SrCl_2.2H_2O$. This shows that halides of group 2 elements :

A. are hygroscopic in nature

B. act as dehydrating agent

C. can absorb moisture from air

D. all of the above

Answer: D

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23. Which of the following has maxiumum ionisation energy ?

A. $Ba \rightarrow Ba^{+} + e^{-}$

B. $Be \rightarrow Be^{+} + e^{-}$

C. $Ca \rightarrow Ca^{2+} + 2e^{-}$

D. $Mg \rightarrow Mg^{2+} + 2e^{-}$

Answer: D

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24. Magnesium powder burns in air to give :

A. $Mg(NO_2)_2$

B. $Mg(NO_3)_2$

C. Mg_3N_2

D. $MgCO_3$

Answer: C

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25. $Be(OH)_2$ is insoluble in water while $Ba(OH)_2$ is highly soluble due to

A. Bond order

B. Lattice energy difference

C. Common ion effect

D. Hard acid

Answer: B

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26. The solubilities of carbonates decreases down the magnesium group due to a decrease in

A. inter ionic attractions

B. entropy of solution formation

C. lattice energy

D. hydration energy of cation

Answer: D

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27. Which of the following is decomposed on heating?

A. $MgCO_3$

B. Na_2CO_3

C. K_2CO_3

D. Rb_2CO_3

Answer: A

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28. Among the alkaline earth metals, the element forming predominantly covalent comound is

A. Ba

B. Sr

C. Ca

D. Be

Answer: D

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29. Iron pipes lying under acidic soil are often attached to blockes of magnesium for protection from rusting. Magnesium offers protection to iron against corrostion because it

A. Prevent air from reaching the surface of iron

B. is more readily converted into positive ions

C. Is higher than iron

D. Forms a corrosion – resistance alloy with iron

Answer: B

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30. Which of the following process is used in the extractive metallurgy of magnesium ?

A. Fused salt electrolysis

B. Self- reduction

C. aqueous solution electrolysis

D. Thermite reduction

Answer: A

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31. Which of the following two ions are closer to one another in size ?

A. Li^+ and Na^+

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

C. Be^{2+} and Li^+

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

Answer: D

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32. The pair of amphoteric hydroxides is

A. $Be(OH)_2, Al(OH)_3$

B. $Al(OH)_3, LiOH$

C. $B(OH)_3, Be(OH)_2$

D. $Be(OH)_2, Mg(OH)_2$

Answer: A

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Compound Of Alkaline Earth Metals

1. Which of the following compounds on hydrolysis gives acetylene?

A. Al_4C_3

B. Mg_3N_2

C. CaC_2

D. CaH_2

Answer: C

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2. The molecular formula of Glauber's salt is

A. $MgSO_4.7H_2O$

B. $CuSO_4.5H_2O$

C. $Na_2SO_4.10H_2O$

D. $FeSO_4.7H_2O$

Answer: C

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3. Plaster of paris is

A. $CaSO_4.2H_2O$

B. $CaSO_4.3H_2O$

C. $CaSO_4.\ H_2O$

D. $CaSO_4.\ \frac{1}{2}H_2O$

Answer: D

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4. A sodium salt of unknown anion when treated with $MgCl_2$ gives a white ppt. On boiling. The anion is

A. HCO_3^-

B. NO_3^-

C. CO_3^{2-}

D. SO_3^{2-}

Answer: A

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5. The calcium salt used as manure is

A. CaC_2

B. $CaCN_2$

C. $CaCO_3$

D. $CaSO_4$

Answer: B

Watch Video Solution

6. $MgCl_2.6H_2O$ on heating gives anhydrous $MgCl_2$.

A. Magnesium oxide

B. Magnesium oxychloride

C. Magnesium dichloride

D. Magnesium chloride

Answer: C

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7. $Ba(OH)_2$ is used to estimate the amount of

A. N_2

B. CO_2

C. CO

D. N_2O

Answer: B

Watch Video Solution

8. $Be(OH)_2$ is

A. Acidic

B. Basic

C. Amphoteric

D. Neutral

Answer: C

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9. Which of the following substance is used as dehydrating agent in laboratory ?

A. Calcium chloride

B. Sodium chloride

C. Sodium carbonate

D. Potassium nitrate

Answer: A

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10. The following compounds have been arranged in order of their increasing thermal statbilties . 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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11. A metal M readily forms its sulphate MSO_4 which is water soluble. It forms oxide MO which becomes inert on heating. It forms insoluble hydroxide which is soluble in $NaOH$. The metal M is:

A. Mg

B. Ba

C. Ca

D. Be

Answer: D

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12. Sorel's cement is

A. Portland cement $+MgO$

B. $MgCl_2.\ CaSiO_3.2H_2O$

C. $CaSiO^3.\ MgCO_3$

D. $MgCl_2.5MgO.\ xH_2O$

Answer: D

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13. Setting of plaster of Paris involves

A. the oxidation with atmospheric oxygen.

B. the removal of water to form anhydrous calcium sulphate.

C. the hydration to form the othorhombic form of gypsum.

D. the reaction with atmospheric carbon dioxide gas

Answer: C

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14. When 1 mole of a substance (X) was treated with an excess of water, 2 moles of readily combustible gas

were produced along with solution which when reacted with CO_2 gas produced a white turbidity. The substance (X) could be

A. Ca

B. CaH_2

C. $Ca(OH)_2$

D. $Ca(NO_3)_2$

Answer: B

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15. Blanc fixe used in paints is

A. finely divided $BaSO_4$

B. mixture of BaS and $ZnSO_4$

C. paste of slaked lime

D. paste of $Mg(OH)_2$

Answer: A

Watch Video Solution

16. A sodium salt of unknown anion when treated with $MgCl_2$ gives a white $ppt.$ on boiling. The anion is

A. HCO_3

B. CO_3^{2-}

C. NO_3^-

D. SO_4^{2-}

Answer: A

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17. Which of the following is obtained on hydrolysis of Mg_2C_3?

A. methane

B. ethane

C. ethyne

D. allylene

Answer: D

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

A. sea shells

B. dolomite

C. a marble statue

D. calcined gypsum

Answer: D

Watch Video Solution

19. Calcium hydroxide is

A. Acidic

B. Basic

C. Amphoteric

D. Neutral

Answer: B

Watch Video Solution

20. Colemanite is

A. $Ca\left[B_3O_4(OH)_2\right].2H_2O$

B. $Ca_2B_6O_{11}.5H_2O$

C. $Ca(OH)_2$

D. $Na_2B_4O_7.2H_2O$

Answer: B

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21. Gypsum $CaSO_4.2H_2O$ on heating to about 120° forms a compound which has the chemical composition represented by

A. $CaSO_4$

B. $2CaSO_4.\ H_2O$

C. $CaSO_4.H_2O$

D. $2CaSO_4.3H_2O$

Answer: B

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22. The compound springkled on road to keep them wet and prevent dust from flying is

A. Calcium hydroxide

B. Calcium chloride

C. Calcium sulphate

D. Calcium hydride

Answer: B

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23. Mark the incorrect statement

A. Lithopone is cheap and possess good covering power

B. Lithopone is yellow pigment

C. Lithopone is prepared by mixing barium sulphide and zinc sulphate

D. Lithopone is a mixture of barium sulphate and zinc sulphide

Answer: B

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24. The mixture of $MgCl_2$ and MgO is called _____.

A. Double salt

B. Sorrel cement

C. Portland cement

D. None of these

Answer: B

Watch Video Solution

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

A. $KClO_3$

B. $CaCO_3$

C. NH_4NO_3

D. $NaNO_3$

Answer: B

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26. When magnesium ammonium phosphate is heated, it is converted to

A. Magnesium pyrophosphate

B. Magnesium oxide

C. Magnesium phosphate

D. Magnesium nitride

Answer: A

Watch Video Solution

27. Which is quick lime ?

A. $Ca(OH)_2$

B. CaO

C. $CaCO_3$

D. $Ca(OH)_2 + H_2O$

Answer: B

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28. $MgSO_4 + NH_4Cl + Na_2HPO_4 \rightarrow$ White crystalline precipitate.

A. $MgCl_2.\ MgSO_4$

B. $MgSO_4$

C. $Mg(NH_4)PO_4$

D. $Mg(PO_4)_2$

Answer: C

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29. In line kilns, the following reaction,

$CaCO_3(s) \Leftrightarrow CaO(s) + CO_2(g)$

proceeds to completion because of

A. of high temperature

B. CaO is more stable than $CaCO_3$

C. CO_2 escapes simultaneously

D. CaO is not dissociated

Answer: C

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30. In curing cement plasters, water is sprinkled from time to time. This helps in

A. hydrating sand and gravel mixed with cement

B. converting sand into silicate

C. developing interlocking needle like crystals of hydrated silicate

D. keeping it cold

Answer: C

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Section B Assertion Reasoning

1. Assertion (A): Lithium chloride is predominantly covalent compound.

Reason (R): electronegativity difference between Li and CI is small.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: c

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2. Assertion : Among alkali metal cations, $Li^+(aq)$ has the highest electrical conductance.

Reason : $Li^+(aq)$ is the largest alkali metal cation because of greater degree of hydration.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: d

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3. Statement I: Alkali metals dissolve in liquid ammonia to give blue solutions.

Statement II: Alkali metals in liquid ammonia give solvated species of the type $\left[M(NH_3)_n\right]^{\oplus}$ (M = alkali metals).

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: A

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4. Assertion (A): $BaCO_3$ is more soluble in HNO_3 than in water.

Reason (R): Carbonate is a weak base and reacts with $H^{\oplus}$ ions to form strong acid causing barium salt to dissociate.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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5. Assertion : Density is Mg is more than that of Ca.

Reason : It is due to the presence of $3d-$ orbital.

A. Both assertion and reason are true and the reason is the correct explanation of the assertion.

B. Both assertion and reason are true but reason is not the correct explanation of the assertion

C. Assertion is true but reason is false.

D. Assertion is false but reason is true.

Answer: c

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6. Assertion : Na_2ZnO_2 is water soluble whereas $Zn(OH)_2$ is insoluble.

Reason : Addition of $NaOH$ solution to $ZnCl_2$ gives white ppt. which dissolves on further addition of $NaOH$ due to the formation of complex cation.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: c

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7. Assertion (A): Sulphur is estimates as $BaSO_4$ and not as $MgSO_4$.

Reason (R): The ionic radius of Mg^{2+} is less than that of Ba^{2+}

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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8. K and Cs are used in photoelectric cells.

K and Cs emit electrons on exposure to light.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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9. Assertion (A): Barium is not required for normal biological function in human beings.

Reason (R): Barium does not show variable oxidation states.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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10. Assertion (A): Na_2SO_4 is soluble in water while $BaSO_4$ is insoluble.

Reason (R): Latice enthalpy of $BaSO_4$ exceeds its hydration enthalpy.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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11. Assertion : Superoxides of alkali metals are paramagnetic.

Reason : Superoxides contain the ion O_2^- which has one unpaired electron.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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12. Assertion : Solutions of alkali metals in liquid ammonia are good reducing agents.

Reason : They contain free or solvated electrons.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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13. Assertion : Solubilities of alkali metal fluorides and carbonates increase down the group.

Reason : Hydration energies of alkali metal halides decrease down the group with increase in size of cations.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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14. Assertion : All alkali metals do not form superoxides as one of the main products in excess of air on heating. Reason : Superoxide reacts with carbon monoxide producing a white powder and liberating dioxygen.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: C

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15. Assertion : Na_2SO_4 can be used as the starting material for the preparation of sodium carbonate and sodium hydroxide.

Reason : Sodium hydroxide is prepared by the treatment of milk of lime with sodium carbonate.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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16. Assertion : Potassium carbonate can be prepared by Solvay process like sodium carbonate using potassium

chloride as starting material.

Reason : Potassium carbonate is obtained as one of the porducts when potassium superoxide reacts with carbon dioxide.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: d

Watch Video Solution

17. Assertion (A): $BaCO_3$ is more soluble in HNO_3 than in water.

Reason (R): Carbonate is a weak base and reacts with $H^{\oplus}$ ions to form strong acid causing barium salt to dissociate.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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18. Assertion : The crystalline salts of alkaline earth metals contain more water of crystallisation than the correcponding alkali metal salts.

Reason : Alkaline earth metals have smaller size and more nuclear charge.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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19. Assertion : Sodium bicarbonate generally precipitates normal carbonate from magnesium chloride solution.

Reason : Sodium carbonate generally precipitates basic carbonate from magnesium chloride solution.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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20. Assertion : The decahydrated form of sodium carbonate on standing in air effloresces.

Reason : It converts into monohydrate having formul, $Na_2CO_3.H_2O$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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21. Assertion : Solution of sodium hydroxide can be stored in a vessel made of Zn or Al.

Reason : Sodium ferrite on treatment with hot water produces sodium hydroxide.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: d

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22. Assertion : White precipitate of $BaSO_4$ is insoluble in water but readily dissolves in the solution of sodium salt of ethylenediaminetertraacetic acid (EDTA).

Reason : Ba^{2+} forms a stable water soluble complex with the anion of the sodium salt of EDTA.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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23. Assertion : The dissolution of alkali metal hydroxides in water is an exothermic reaction.

Reason : Intense hydration of alkali metal hydroxides causes the evolution of much heat.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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24. Assertion : Potassium is not obtained by the electrolysis of fused KCl.

Reason : Potassium vapourises at the melting point of KCl.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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25. Assertion : Setting of cement is an endothermic process.

Reason : Setting of cement involves hydration and rearrangement of the molecules of calcium aluminates and calcium silicates.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: d

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26. Assertion : Lithium is the weakest reducing agent among the alkali metals.

Reason : In alkali metals, ionization energy decreases down the group .

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: d

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27. Assertion (A): Aqueous solution of Na_2CO_3 is alkaline in nature.

Reason (R): when dissolved in water, Na_2CO_3 undergoes anionic hydrolysis.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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28. Assertion : Caesium is used in photoelectric cells.

Reason : Caesium is most electropositive element.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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29. Assertion : Berylium does not impart any characteristic colour to the Bunsen flame.

Reason : Due to its very high ionization energy, beryllium requires a large amount of energy for excitation of the electrons.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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30. Assertion : Ionization energy of Be is almost the same as that of Al.

Reason : Best diagonal relation ship is shown between Be and Al.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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31. Assertion : $BeCl_2$ fumes in moist air.

Reason : $BeCl_2$ reacts with moisture to form HCl gas.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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32. Assertion : $BeSO_4$ and $MgSO_4$ are soluble in water.

Reason : $BaSO_4$ is water insoluble because lattice energy of $BaSO_4$ is higher than its hydration energy.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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33. Assertion : As the very dilute solutions of alkali metals in liquid ammonia are made more concentrated,

the molar conductivity at first decreases, reaching a minimum at about 0.05 molar, thereafter , it increases again.

Reason : The molar conductivity of the saturated solution of the alkali metals in liquid ammonia at $-33^{\circ}C$ is comparable to that of a metal.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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Aipmt Neet Questions

1. The alkali metals form salt like hydrides by the direct synthesis at elevated temperature. The termal stability of these hydrides decreases in which of the following orders ?

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

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

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

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

Answer: C

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

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

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

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

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

Answer: D

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3. 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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4. Which of the following statements is not true ?

A. $K_2Cr_2O_7$ solution in acidic medium is orange

B. $K_2Cr_2O_7$ solution becomes yellow on increasing the pH beyond 7

C. On passing H_2S through acidified $K_2Cr_2O_7$ solution, a milky color is observed

D. $Na_2Cr_2O_7$ is preferred over $K_2Cr_2O_7$ in volumetric analysis

Answer: D

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5. In the replacement reaction

$$\rightarrow C - I + MF \rightarrow \ \rightarrow C - F + MI$$

The reaction will be most favourable if M happens to be

A. Na

B. K

C. Rb

D. Li

Answer: C

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6. The function of Sodium pump is a biological process operating in each and every cell of all animals. Which of the following biologicaly important ions is also constant f this pump ?

A. Mg^{2+}

B. K^{+}

C. Fe^{2+}

D. Ca^{2+}

Answer: B

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7. On heating which of the following release CO_2 most easily ?

A. $MgCO_3$

B. $CaCO_3$

C. K_2CO_3

D. Na_2CO_3

Answer: A

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8. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are

put under an electric field ?

A. K

B. Rb

C. Li

D. Na

Answer: C

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9. H_2O is depolar, wheras BeF_2 is not. it because

A. the electronegativity of F is greater than O

B. H_2O involves $H-$ bonding, whereas BeF_2 is discrete molecule

C. H_2O is linear, and BeF_2 is angular

D. H_2O is angular, and BeF_2 is linear

Answer: D

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10. A solid compound $'X'$ on heating gives CO_2 gas and a residue. The residue mixed with water forms $'Y'$. On passing an excess of CO_2 through $'Y'$ in water , a clear solution, $'Z'$ is obtained. On boiling $'Z'$, compound $'X'$ is reformed. The compound $'X'$ is

A. $Ca(HCO_3)_2$

B. $CaCO_3$

C. Na_2CO_3

D. K_2CO_3

Answer: B

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11. The product obtained on fusion of $BaSO_4$ and Na_2CO_3 is

A. $BaCO_3$

B. BaO

C. $Ba(OH)_2$

D. $BaHSO_4$

Answer: A

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

A. $NaCl < LiCl < BeCl_2$

B. $BeCl_2 < NaCl < LiCl$

C. $BeCl_2 < LiCl < NaCl$

D. $LiCl < NaCl < BeCl_2$

Answer: A

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13. Which one of the following compounds is a peroxide?

A. KO_2

B. BaO_2

C. MnO_2

D. NO_2

Answer: B

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14. Property of the alkaline earth metals that increases with their atomic number is

A. solubility of their hydroxide in water

B. solubility of their sulphates in water

C. ionisation energy

D. electronegativity

Answer: A

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

A. $CaSO_4$

B. $BeSO_4$

C. $BaSO_4$

D. $SrSO_4$

Answer: B

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16. Which of the following compounds has the lowest melting point ?

A. CaF_2

B. $CaCl_2$

C. $CaBr_2$

D. CaI_2

Answer: D

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

A. $Ca > Sr > Ba > Mg$

B. $Sr > Ca > Mg > Ba$

C. $Ba > Mg > Sr > Ca$

D. $Mg > Ca > Sr > Ba$

Answer: D

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18. Which of the following statements is false ?

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

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

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

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

Answer: D

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19. Among $CaH_2, BeH_2, BaH_2,$ the order of ionic character is

A. $BeH_2 < CaH_2 < BaH_2$

B. $CaH_2 < BeH_2 < BaH_2$

C. $BeH_2 < BaH_2 < CaH_2$

D. $BaH_2 < BeH_2 < CaH_2$

Answer: A

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Aiims Questions

1. When washing soda is heated.

A. Co is released

B. $CO + CO_2$ is released

C. CO_2 is released

D. Water vapour is released

Answer: D

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2. Which of the following reacts with water with high rate ?

A. Li

B. K

C. Na

D. Rb

Answer: D

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3. When sodium is heated with moist air, then the product obtained is

A. Na_2O

B. $NaOH$

C. Na_2CO_3

D. Na_2O_2

Answer: A

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

A. Blue coloured solution is obtained

B. Na^+ ions are formed in the solution

C. Liquid NH_3 becomes good conductor of electricity

D. Liquid ammonia remains diamagnetic

Answer: D

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5. NaOH is prepared by the

A. Down's cell

B. Castner cell

C. Solvay process

D. Castner Kellner cell

Answer: D

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6. Which of the following metal has stable carbonates ?

A. Na

B. Mg

C. Al

D. Si

Answer: A

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7. Photoelectric effect is the maximum in

A. Cs

B. Na

C. K

D. Li

Answer: A

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8. The cell used for the electrolysis of fused $NaCl$ is

A. Down's cell

B. Castner cell

C. Solvay cell

D. Nelson cell

Answer: A

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9. If Na is heated in presence of air, it forms

A. Na_2CO_3

B. Na_2O_2

C. Na_2O

D. Both (b) and (c)

Answer: D

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10. Assertion (A): Alkali metals can form ionic hydrides which contain hydride ion, H.

Reason (R): The alkali metals have low EN. Their hydrides conduct electricity, when fused and liberate hydrogen at the anode.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

11. Assertion : Alkali metals have least value of ionization energy within a period.

Reason : They precede alkaline earth metals in periodic table.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: b

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12. Which of the following sulphates have the highest solubitiy in water ?

A. $MgSO_4$

B. $BaSO_4$

C. $CaSO_4$

D. $BeSO_4$

Answer: D

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13. Calcium is obtained by the

A. roasting of lime stone

B. reduction of $CaCl_2$ with carbon

C. electrolysis of a solution of $CaCl_2$ in water

D. electrolysis of molten $CaCl_2$

Answer: D

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14. Lithopone is a mixture of

A. $BaO + ZnSO_4$

B. $ZnO + BaSO_4$

C. $BaS + ZnSO_4$

D. $ZnS + BaSO_4$

Answer: D

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15. A substance absorbs CO_2 and violently reacts with water. The substance is

A. $CaCO_3$

B. CaO

C. H_2SO_4

D. ZnO

Answer: B

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16. Alkaline earth metals are denser than alkali metals, because metallic bonding in alkaline earth metals is

A. Stronger

B. weaker

C. not present

D. volatile

Answer: A

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17. The correct order of decreasing ionic character is

A. $BeCl_2 < MgCl_2 < CaCl_2 < BaCl_2$

B. $BeCl_2 < MgCl_2 < BaCl_2 < CaCl_2$

C. $BeCl_2 < BaCl_2 < MgCl_2 < CaCl_2$

D. $BaCl_2 < CaCl_2 < MgCl_2 < BeCl_2$

Answer: A

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18. Whivh of the following hydroxide is insoluble in water ?

A. $Be(OH)_2$

B. $Mg(OH)_2$

C. $Ca(OH)_2$

D. $Ba(OH)_2$

Answer: A

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19. The element having atomic number 56 belongs to

A. Actinides

B. Alkaline earth metals

C. Transition series

D. Lanthanides

Answer: B

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20. Colemnite is

A. $Ca\left[B_3O_4(OH)_2\right].2H_2O$

B. $Ca_2B_6O_{11}.SH_2O$

C. $Ca(OH)_2$

D. $Na_2B_4O_7.2H_2O$

Answer: B

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21. Which of the following types of metal form the most efficient catalysts?

A. Alkali metals

B. Alkaline earth metals

C. Transition metals

D. All of these

Answer: C

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22. The correct order of solubility of the following compounds in water is

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

B. $BaCO_3 > CaCO_3$

C. $Ca(OH)_2 = Mg(OH)_2$

D. $CaSO_4 < MgSO_4$

Answer: B

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23. Hybrid of boron occurs as B_2H_6 but B_2Cl_6 does not exist. This is because.

A. $p\pi - p\pi$ back bonding is possible in B_2H_6 but not in B_2Cl_6

B. boron and hydrogen have almost equal values of electronegativity.

C. boron and chlorine have almost equal atomic sizes

D. small hydrogen atoms can easily fit in between boron atoms but large chlorine atoms do not.

Answer: C

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Assertion Reasoning Questions

1. Assertion (A): magnesium is not present in enamel of human teeth.

Reason (R): Magnesium is an essential elements for biological functions of human beings.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: B

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2. Assertion (A): Addtion of NH_4OH to an aqueous solution of $BaCl_2$ in the presence of excess of NH_4Cl

precipitates $Ba(OH)_2$.

Reason (R): $Ba(OH)_2$ is insoluble in water.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

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Section D Chapter End Test

1. Plaster of Paris hardens by

A. giving off CO_2

B. utilizing water

C. changing into $CaCO_3$

D. giving out water

Answer: B

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2. The mixture of $MgCl_2$ and MgO is called _____.

A. Sorel cement

B. mixed salt

C. Portland cement

D. magnesium oxychloride

Answer: A

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3. Which monoxide of alkali metals is slowly hydrolysed ?

A. Li

B. Na

C. K

D. Cs

Answer: A

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4. Which of the following has lowest thermal stability ?

A. Li_2CO_3

B. Na_2CO_3

C. K_2CO_3

D. Rb_2CO_3

Answer: A

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5. Solution of K_2O in water in basic, because it contains a significant concentration of

A. O_2^{2-}

B. O^{2-}

C. OH^-

D. K^+

Answer: C

Watch Video Solution

6. The order of melting point of chloirdes of alkali metals is :

A. $LiCl > NaCl > KCl > CsCl$

B. $LiCl > NaCl > KCl > CsCl$

C. $NaCl > KCl > CsCl > LiCl$

D. $LiCl > NaCl > CsCl > KCl$

Answer: C

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7. Sodium carbonate reacts with SO_2 in aqueous medium to give

A. $NaHSO_3$

B. Na_2HCO_3

C. $Na_2S_2O_3$

D. $NaHSO_4$

Answer: A

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8. Sodium dichormate on heating with coke yields :

A. sodium carbonate

B. sodium chromite

C. sodium chromate

D. chromic anhydride

Answer: A

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9. Which one out of the $NaOH$ and KOH is a better absorber of CO_2 ?

A. $NaOH$

B. KOH

C. both absorb CO_2 equally

D. cannot be predicted

Answer: B

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10. Reduction of sodium nitrite by sodium metal yields:

A. NaO_2

B. Na_2O_2

C. Na_2O

D. NaN_3

Answer: C

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11. Which of the following statement is incorrect ?

A. The atomic radius of Na is greater than that of Mg

B. Metallic bond in Mg is stronger than the metallic bond in Na

C. Melting and boiling points of Mg are greater than those of Ca

D. Mg and Ca both impart characteristic colour to the flame

Answer: D

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12. What products are formed during the electrolysis of a of a concentrated aqueous solution of sodium chloride ?

I. $Cl_2(g)$, II. $NaOH(aq)$, III. $H_2(g)$.

A. I only

B. I and II only

C. I and III only

D. All of these

Answer: D

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13. $Na + Al_2O_3 \xrightarrow{\text{High temp.}} X \xrightarrow[\text{water}]{CO_2 \text{ in}} Y$, compound is

A. $NaAlO_2$

B. $NaHCO_3$

C. Na_2CO_3

D. Na_2O_2

Answer: C

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14. What happens when a mixture of sodium sulphate, lime stone and coke is heated in a furnace ?

A. Black ash containing sodium carbonate and calcium sulphide is formed.

B. Carbon dioxide gas is liberated.

C. Sodium carbonate and calcium sulphate is formed.

D. (a) and (b) both

Answer: A

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15. The order of basicity of hydroxides of alkali metals is

A. $NaOH > KOH > RbOH$

B. $NaOH > RbOH > KOH$

C. $RbOH > KOH > NaOH$

D. $RbOH > NaOH > KOH$

Answer: C

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16. What happens when sodium metal is heated to a temperature $350^{\circ}C$ in excess of dry air containing carbon dioxide gas ?

A. Na_2O_2 is formed.

B. Na_2O is formed

C. First Na_2O_2 is formed which then converts into Na_2CO_3.

D. First NaO is formed which then converts into Na_2CO_3.

Answer: C

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17. Solubility of an ionic compound in water is mainly dependent on:

a.Lattice enthalpy , b. Hydration enthalphy

Both these factors oppose each other and the resultant of these determines the solubility of an ionic compound in water. If lattce enthalpy has greater value, the compound is less soluble.

In case hydration enthalpy has greater value, the compound is highly soluble in water.

BeF_2 is soluble in water while fluorides of other alkaline earth metals are insoluble because of:

A. ionic nature of BeF_2

B. greater hydration energy of Be^{2+} ion as compared to lattice energy

C. covalent nature of BeF_2

D. none of these

Answer: B

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18. $Na_2Be(OH)_4]$ is formed when

A. BeO reacts with $NaOH$ solution

B. $Be(OH)_2$ reacts with $NaOH$ solution.

C. Both (a) and (b) are correct

D. none of the above is correct.

Answer: C

 Watch Video Solution

19. What is the formula of basic anhydride of $Ba(OH)_2$?

A. Ba_2O

B. BaO

C. BaO_2

D. Ba

Answer: B

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20. What is the correct order of thermal stability of carbonates of alkaline earth metals?

A.

$$BeCO_3 < MgCO_3 < CaCO_3 < SrCO_3 < BaCO_3$$

B.

$$BeCO_3 < MgCO_3 \approx CaCO_3 > SrCO_3 < BaCO_3$$

C.

$$BeCO_3 < MgCO_3 > CaCO_3 > SrCO_3 > BaCO_3$$

D.

$$BeCO_3 > MgCO_3 \approx CaCO_3 < SrCO_3 < BaCO_3$$

Answer: A

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21. Beryllium has less negative value of reduction potentials compared to other alkaline earth metals due to:

A. the smaller hydration energy of the Be^{2+}

B. the large value of the atomization enthalpy of the Be metal.

C. the large value of ionisation of the Bemetal.

D. (b) and (c) both

Answer: D

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22. When CO_2 is passed through the suspenstion of $MgCO_3, Mg(OH)_2$ (basic carbonate), the product formed is

A. $MgCO_3$

B. MgO and H_2O

C. $Mg(HCO_3)_2$

D. $MgCO_3$ and CO_3

Answer: C

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23. Which of the followings salts on heating gives a mixture of two gases ?

A. $Ba(NO_3)_2$

B. $NaNO_3$

C. KNO_3

D. $RbNO_3$

Answer: A

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24. Setting of plaster of Paris involves

A. the oxidation with atmospheric oxygen.

B. the removal of water to form anhydrous calcium sulphate.

C. the hydration to form the othorhombic form of gypsum.

D. the reaction with atmospheric carbon dioxide gas

Answer: C

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25. The compound that gives hydrogen peroxide on treatment with a dilute cold acid is:

A. PbO_2

B. Na_2O_2

C. MnO_2

D. SnO_2

Answer: B

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26. In the above reaction how many grams of $KClO_3$ is formed by $100L$ of Cl_2, whose pressure of $950mmHg$ at $25^\circ C$.

A. $200g$

B. $208.6g$

C. $220g$

D. $322.79g$

Answer: B

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27. Assertion : Potassium carbonate can be prepared by Solvay process like sodium carbonate using potassium chloride as starting material.

Reason : Potassium carbonate is obtained as one of the porducts when potassium superoxide reacts with carbon dioxide.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: d

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28. Assertion : White precipitate of $BaSO_4$ is insoluble in water but readily dissolves in the solution of sodium salt of ethylenediaminetertraacetic acid (EDTA).

Reason : Ba^{2+} forms a stable water soluble complex with the anion of the sodium salt of EDTA.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: a

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29. Assertion : $BeSO_4$ and $MgSO_4$ are soluble in water.

Reason : $BaSO_4$ is water insoluble because lattice energy of $BaSO_4$ is higher than its hydration energy.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: B

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