

1. Which ion forms a hydroxide highly soluble in water?
  - (a)  $\text{Ni}^{2+}$
  - (b)  $\text{K}^+$
  - (c)  $\text{Zn}^{2+}$
  - (d)  $\text{Al}^{3+}$

Sodium reacts with water less vigorously than potassium because:

  - (a) it has higher atomic weight
  - (b) it is less electropositive
  - (c) it is more electronegative
  - (d) it is metal
2. A colourless salt gives violet colour to Bunsen flame and also turns moistened litmus paper blue. It is:
  - (a)  $\text{Na}_2\text{CO}_3$
  - (b)  $\text{KNO}_3$
  - (c)  $\text{K}_2\text{CO}_3$
  - (d)  $\text{Cu}(\text{OH})_2$

$\text{NO}_2$  is obtained by heating:

  - (a)  $\text{CsNO}_3$
  - (b)  $\text{KNO}_3$
  - (c)  $\text{LiNO}_3$
  - (d)  $\text{NaNO}_3$
3. Hypo is chemically:
  - (a)  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$
  - (b)  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$
  - (c)  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 4\text{H}_2\text{O}$
  - (d)  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$

Common table salt becomes moist and does not pour easily in rainy season because:

  - (a) it contains magnesium chloride
  - (b) it contains magnesium carbonate
  - (c) it melts slightly in rainy season
  - (d) sodium chloride is hygroscopic
4. If NaOH is added to an aqueous solution of  $\text{Zn}^{2+}$  ions, a white precipitate appears and on adding excess NaOH, the precipitate dissolves. In this solution zinc exists in the:
  - (a) cationic part
  - (b) anionic part
  - (c) both in cationic and anionic parts
  - (d) there is no zinc left in the solution

Excess of dilute sodium hydroxide solution is gradually added with shaking to an aqueous solution of zinc sulphate. What would you observe?

  - (a) A light blue precipitate is first formed which finally dissolves to give a deep blue solution
  - (b) A white precipitate appears which dissolves to give a colourless solution.
  - (c) A white precipitation is formed which does not dissolve
  - (d) No change takes place and the solution remains clear
5. Brine is chemically:
  - (a) conc. solution of  $\text{Na}_2\text{CO}_3$
  - (b) conc. solution of  $\text{Na}_2\text{SO}_4$
  - (c) conc. solution of NaCl
  - (d) conc. solution of alum

The products of the electrolysis of concentrated aqueous solution of common salt are:

  - (a)  $\text{Na} + \text{Cl}_2$
  - (b)  $\text{H}_2 + \text{O}_2$
  - (c)  $\text{NaOH} + \text{H}_2 + \text{Cl}_2$
  - (d)  $\text{NaOH} + \text{Cl}_2 + \text{O}_2$
- 6.
- 7.
- 8.
- 9.
- 10.

11.  $\text{KO}_2$  is used in oxygen cylinder in space air craft and submarines because it:
- absorbs  $\text{CO}_2$  and increase  $\text{O}_2$  content
  - eliminate moisture
  - absorbs  $\text{CO}_2$
  - produces  $\text{O}_2$
- (b) it floats to the surface of kerosene because of low density
- (c) it does not react with air and  $\text{H}_2\text{O}$
- (d) none of the above
12. Potash alum is used in purification of water because:
- it kills the micro-organisms
  - it precipitates the colloidal matter
  - it removes the hardness of water
  - it catalyses the removal of impurities
13. The byproduct of Solvay process is:
- $\text{CO}_2$
  - $\text{NH}_3$
  - $\text{CaCl}_2$
  - $\text{CaCO}_3$
14. The raw materials in Solvay process are:
- $\text{NaOH}$ ,  $\text{CaO}$  and  $\text{NH}_3$
  - $\text{Na}_2\text{CO}_3$ ,  $\text{CaCO}_3$ , and  $\text{NH}_3$
  - $\text{Na}_2\text{SO}_4$ ,  $\text{CaCO}_3$  and  $\text{NH}_3$
  - $\text{NaCl}$ ,  $\text{NH}_3$ ,  $\text{CaCO}_3$
15. Manufacture of  $\text{NaOH}$  is done by:
- Canstner - Kellner process
  - Solvay process
  - Brine process
  - Mond's process
16. Lithium is the only alkali metal which is not placed in kerosene but is wrapped in paraffin wax, because:
- it reacts with kerosene
- (b) it floats to the surface of kerosene because of low density
- (c) it does not react with air and  $\text{H}_2\text{O}$
- (d) none of the above
17. When  $\text{CO}_2$  is bubbled into an aqueous solution of  $\text{Na}_2\text{CO}_3$ , the following is formed:
- $\text{H}_2\text{O}$
  - $\text{OH}^-$
  - $\text{NaHCO}_3$
  - $\text{NaOH}$
18. The principal products obtained on heating iodine with concentrated caustic soda solution are:
- $\text{NaOI} + \text{NaI}$
  - $\text{NaIO}_3 + \text{NaI}$
  - $\text{NaOI} + \text{NaIO}_3 + \text{NaI}$
  - $\text{NaIO}_4 + \text{NaI}$
19. Which of the following acts as reducing agent as well as oxidising agent?
- $\text{Na}_2\text{O}$
  - $\text{Na}_2\text{O}_2$
  - $\text{NaNO}_3$
  - $\text{KNO}_3$
20. Which of the following alkali metal ion in aqueous solution is the best conductor of electricity?
- $\text{Li}^+$
  - $\text{Na}^+$
  - $\text{Cs}^+$
  - $\text{K}^+$
21. Which of the following is soluble in pyridine:-
- $\text{LiCl}$

- (2) CsCl  
(3) NaCl  
(4) KCl
22. Ionic mobility of which of the following alkali metal ions is lowest when an aqueous solution of their salts are put under an electric field?  
(a) Na (b) K  
(c) Rb (d) Li
23. In context with beryllium, which one of the following statements is incorrect?  
(a) It is rendered passive by nitric acid  
(b) It forms  $\text{Be}_2\text{C}$   
(c) Its salts rarely hydrolyse  
(d) Its hydride is electron-deficient and polymeric
24. Which of the statements is not true?  
(a) On passing  $\text{H}_2\text{S}$  through acidified  $\text{K}_2\text{Cr}_2\text{O}_7$  solution, a milky colour is observed  
(b)  $\text{Na}_2\text{Cr}_2\text{O}_7$  is preferred over  $\text{K}_2\text{Cr}_2\text{O}_7$  in volumetric analysis  
(c)  $\text{K}_2\text{Cr}_2\text{O}_7$  solution in acidic medium is orange  
(d)  $\text{K}_2\text{Cr}_2\text{O}_7$  solution becomes yellow on increasing the pH beyond 7
25. The solubility of metal halides depends on their nature, lattice enthalpy and hydration enthalpy of the individual ions. Amongst fluorides of alkali metals, the lowest solubility of LiF in water is due to:  
(a) Ionic nature of lithium fluoride (b) High lattice enthalpy  
(c) High hydration enthalpy of lithium ion (d) Low ionisation enthalpy of lithium atom
26. By adding gypsum to cement:  
(a) Setting time of cement becomes less (b) Setting time of cement increases  
(c) Colour of cement becomes light (d)
- Shining surface is obtained
27. Calcium imide on hydrolysis gives gas (B) which on oxidation by bleaching powder gives gas (C). Gas (C) on reaction with magnesium give compound (D) which on hydrolysis gives again gas (B)> Identify (B), (C) and (D).  
(a)  $\text{NH}_3$ ,  $\text{N}_2$ ,  $\text{Mg}_3\text{N}_2$   
(b)  $\text{N}_2$ ,  $\text{NH}_3$ ,  $\text{MgNH}$   
(c)  $\text{N}_2$ ,  $\text{N}_2\text{O}_5$ ,  $\text{Mg}(\text{NO}_3)_2$   
(d)  $\text{NH}_3$ ,  $\text{NO}_2$ ,  $\text{Mg}(\text{NO}_2)_2$
28. Property of all the alkaline earth metals that increases with their atomic number is :  
(A) Solubility of their carbonates  
(B) Thermal stability of their sulphates  
(C) Ionisation energy  
(D) Electronegativity
29. Which of the following acts as an oxidizing as well as a reducing agent?  
(A)  $\text{Na}_2\text{O}$   
(B)  $\text{NaO}_3$   
(C)  $\text{NaNO}$   
(D)  $\text{NaNO}_2$
30. A metal [x] on heating on nitrogen gas gives [Y]. [Y] on treatment with  $\text{H}_2\text{O}$  gives a colourless gas which when passed through  $\text{CuSO}_4$  solution gives a blue colour. [Y] is  
(A)  $\text{Mg}(\text{NO}_3)_2$   
(B)  $\text{Mg}_3\text{N}_2$   
(C)  $\text{NaN}_3$   
(D)  $\text{MgO}$
31. The density of-  
(A)  $\text{Na} > \text{K}$   
(B)  $\text{Na} = \text{K}$   
(C)  $\text{K} > \text{Na}$

- (D)  $\text{Li} > \text{K}$
32. In  $\text{K}^+\text{F}^-$  ionic radius of  $\text{F}^-$  is more while atomic radius of  $\text{K}^+$  is –
- (A) Less than  $\text{F}^-$
- (B) More than  $\text{F}^-$
- (C) Equal to  $\text{F}^-$
- (D) None of these
33. Lattice energy is lowest for –
- (A)  $\text{LiF}$
- (B)  $\text{NaCl}$
- (C)  $\text{KBr}$
- (D)  $\text{CsI}$
34. Which of the following halides has the highest melting point-
- (A)  $\text{NaCl}$
- (B)  $\text{KCl}$
- (C)  $\text{NaBr}$
- (D)  $\text{NaF}$
35. Alkaline earth metals form hydrated crystalline solids such as  $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ ,  $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ . This is due to-
- (A) Smaller ionic size
- (B) Increased charge on ions
- (C) Higher hydration enthalpies
- (D) High oxidation potential
36. Magnesium can be prepared by heating-
- (A)  $\text{MgCl}_2$  with  $\text{CaO}$  at 1775 K
- (B)  $\text{MgCl}_2$  with  $\text{CaC}_2$  at 1775 K
- (C)  $\text{MgCl}_2$  with  $\text{Ca(OH)}_2$  under pressure
- (D)  $\text{MgO}$  with  $\text{CaC}_2$  at ordinary temperature
37. A chloride dissolves appreciably in cold water. When placed in a platinum wire in Bunsen flame no distinctive colour is noticed. Which cation could be present –
- (A)  $\text{Be}^{2+}$
- (B)  $\text{Ba}^{2+}$
- (C)  $\text{Pb}^{2+}$
- (D)  $\text{Ca}^{2+}$
38. Which of the following is a false statement-
- (A) Sodium oxide is more basic than magnesium oxide.
- (B) Beryllium oxide is amphoteric
- (C) The thermal stability of beryllium carbonate is more than that of calcium carbonate
- (D) Beryllium is amphoteric
39. Which alkali metal has the lowest melting point and exists as a liquid –
- (A)  $\text{Na}$
- (B)  $\text{K}$
- (C)  $\text{Rb}$
- (D)  $\text{Cs}$
40. Two metals X and Y form covalent halides. Both halides can act as Lewis acids and a catalyst in Friedel Crafts reaction. Halide of X is polymer in the solid state and a dimer in the vapour state which decomposes to monomer at 1200 K. However, halide of Y is a dimer in vapour state and becomes ionic in polar solvent. X and Y are respectively.
- (A)  $\text{Be}$ ,  $\text{Al}$
- (B)  $\text{Al}$ ,  $\text{Be}$
- (C)  $\text{Be}$ ,  $\text{Ca}$
- (D)  $\text{Mg}$ ,  $\text{Ca}$
41. Solubility of sulphates in water decreases from  $\text{MgSO}_4$  to  $\text{BaSO}_4$ . It is due to the fact that –
- (A) Ionic nature increases
- (B) Size of  $\text{M}^{2+}$  ion increases
- (C) Lattice energy decrease
- (D) Hydration enthalpy of  $\text{M}^{2+}$  ions decreases

42.

Alkali metal ions are-

- (A) Diamagnetic and coloured
- (B) Diamagnetic and colourless
- (C) Paramagnetic and coloured
- (D) Paramagnetic and colourless

43.

The compound X on heating gives a colourless gas. The residue is dissolved in water to obtain Y. Excess of  $CO_2$  is bubbled through aqueous solution of Y, Z is formed. Z on gentle heating gives back X. The compound X is-

- (A)  $CaCO_3$
- (B)  $Na_2CO_3$
- (C)  $CaSO_4 \cdot 2H_2O$
- (D)  $K_2CO_3$

44.

Insoluble compound in acetic acid is-

- (A) Calcium oxide
- (B) Calcium carbonate
- (C) Calcium oxalate
- (D) Calcium hydroxide

45.

Assertion : s-block elements do not occur free in nature

Reason : s-block elements are highly electropositive in nature.

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