NEET CHEMISTRY PRACITCE PAPER

Time : 60 Mins **14 S BLOCK ELEMENTS ALKALI ALKALINE 1** **Marks : 200**

1. 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 for lithium ion
   d) low ionisation enthalpy of lithium atom
2. The following metal ion activates many enzymes, participates in the oxidation of glucose to produce AIP and with Na, is responsible for the transmission of nerve signals.
   a) Potassium b) Iron c) Copper d) Calcium
3. Assertion: The fluorides of alkaline earth metals are relatively less soluble than chlorides.
   Reason: Fluorides have high lattice energies.
   a) If both assertion and reason are true and reason is the correct explanation of assertion
   b) If both assertion and reason are true but reason is not the correct explanation of assertion
   c) If assertion is true but reason is false d) If both assertion and reason are false
4. Alkali metals are not found in free state due to their highly reactive nature. This is due to
   a) their large size and low ionisation enthalpy b) their large size and high ionisation enthalpy
   c) their low ionisation enthalpy and high electron gain enthalpy d) their tendency to impart colour to the flame
5. In which of the following processes, fused sodium hydroxide is electrolysed at a $330^{\circ}C$ temperature for extraction of sodium?
   a) Castner's process b) Down's process c) Cyanide process d) Both 'b' and 'c'
6. 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
7. Which of the following has the largest size?
   a) Na b) Na^+ c) Na^- d) Can't be Predicied
8. The alkali metals dissolve in ammonia to give a deep blue solution which is conducting in nature.
   $M+(x+y)NH_3 \longrightarrow [M(NH_3)_x]^{2+} + 2[e(NH_3)_y]^-$
   Which of the following is not true about the solutions of alkali metals in liquid ammonia
   a) The blue colour is due to ammoniated electron b) The solution is paramagnetic
   c) The blue colour changes to brown on standing
   d) In concentrated solution blue colour changes to bronze and becomes diamagnetic
9. The compound A on heating gives a colorless gas and a rescue that is dissolve in water obtain B. Excess of CO_2 is bubbled through aqueous solution of B. C is formed which is recovered in the solid form. Solid C on gentle heating gives back A. The compound 'X' is?
   a) $CaSI_42H_2O$ b) $CaCO_3$ c) Na_2CO_3 d) K_2CO_3
10. Washing soda has 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
11. The element A burns in nitrogen to give an ionic compound B. The compound B reacts with water to give C and D. A solution of C becomes milky on bubbling carbon dioxide. What is the nature of compound (D)?
    a) Acidic b) Basic c) Amphoteric d) Neutral
12. The decreasing order of ionization enthalpy in alkali metals is:
    a) Na> Li > K > Rb b) Rb < Na < K < Li c) Li > Na > K> Rb d) K < Li < Na < Rb
13. K_2CO_3 cannot be prepared by Solvay's process because:

a) $KHCO_3$ is less soluble than $NaHCO_3$ b) $KHCO_3$ is too soluble to be precipitated by KCl and NH_4HCO_3
c) K_2CO_3 is more soluble to be precipitated by KCl d) K_2CO_3 is less soluble than Na_2CO_3

14. Assertion: Alkaline earth metal oxides are quite stable to heat.
Reason: Enthalpies of formation of alkaline earth metal oxides are quite high.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

15. What is the biological importance of Na+ and K^+ ions in cell fluids like blood plasma?
a) They participate in transmission of nerve signals
b) They regulate the number of red and white blood corpuscles in the cell
c) They can be present in any amount in the blood since they are absorbed by the cells
d) They regulate the viscosity and colour of the blood

16. Which of the following is arranged according to increasing basic strength?
a) CaO < MgO < SrO < BaO < BeO b) BaO < SrO < CaO < MgO < BeO
c) BeO < MgO < CaO < BaO < SrO d) BeO < MgO < CaO < SrO < BaO

17. Slaked lime reacts with chlorine to give:
a) $CaCl_2$ b) CaO c) $Ca(OCl)_2$ d) $CaCO_3$

18. A metal M readily forms its sulphate MSO_4 which is water soluble. It forms its oxide MO which becomes inert on heating. It forms its insoluble hydroxide $M(OH)_2$ which is soluble in NaOH solution. What would be M?
a) Be b) Ba c) Ca d) Mg

19. The stability of K_2O, K_2O_2 and KO_2 is in order $K_2O < K_2O_2 < KO_2$. This increasing stability as the size of metal ion increases is due to stabilisation of:
a) larger cation by smaller anions through lattice energy effects
b) larger cation by larger anions through lattice energy effects
c) smaller cations by smaller anions through melting point
d) smaller cations by larger anions through melting point

20. Identify W, X, Y, and Z respectively in the given reactions.
$CaCO_3 \xrightarrow{\triangle} W + X$
$W + H_2O \longrightarrow Y$
$Y + Z \longrightarrow NaOH + CaCO_3$
a) CaO, CO_2, $CaCO_3$, Na_2CO_3 b) CO_2, $Ca(OH)_2$, $Ca(HCO)_3$, $NaHCO_3$ c) CaO, CO_2, $Ca(OH)_2$, Na_2CO_3
d) CO_2, CaO, H_2CO_3, Na_2CO_3

21. Which one of the following properties of alkali metals increases in magnitude as the atomic number rises?
a) Ionic radius b) Melting point c) Electronegativity d) First ionization energy

22. Match List-I with List-II for the compositions of substances and select the correct answer using the code given below the lists:
Gypsum
a) $CaSO_4.2H_2O$ b) $CasO_4.\frac{1}{2}H_2O$ c) $MaSO_4.\ 7H_2O$ d) $MgSO_4.H_2O$

23. Assertion: The melting and boiling points of the alkali metals are low.
Reason: Alkali metals have weak metallic bonding.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

24. Lithium salts are mostly hydrated like $LiCl{\cdot}2H_2O$ due to

a) maximum ionisation enthalpy b) maximum degree of hydration of Li^+ c) maximum hygroscopic nature
d) maximum chemical reactivity

25. Which among the following is kinetically inert towards water?
a) Na b) Be c) Ca d) K

26. Which of the following is not true about s-block elements?
a) They have large atomic sizes b) They have lower ionisation enthalpies
c) They have variable oxidation state d) They form basic oxides

27. Metal carbonates decompose on heating to give metal oxide and carbon dioxide. Which of the metal carbonates is most stable thermally?
a) $MgCO_3$ b) $CaCO_3$ c) $SrCO_3$ d) $BaCO_3$

28. The right order of the solubility of sulphates of alkaline earth metals in water is:
a) Be > Ca > Mg > Ba > Sr b) Mg > Be > Ba > Ca > Sr c) Be > Mg > Ca > Sr > Ba
d) Mg > Ca > Ba > Be > Sr

29. The properties of Li are similar to those of Mg. This is because:
a) both have nearly the same size. b) both has their charge to size ratio nearly the same.
c) both have similar electronic configurations d) both are found together in nature

30. In the given chemical reactions,
2P + H_2O + CO_2 $\rightarrow$Q $\xrightarrow{H_2O+CO_2}$ 2R $\xrightarrow{NaCl}$ S+NH_4Cl Identify S.
a) Na_2CO_3 b) NaOH c) $NaHCO_3$ d) NH_3

31. 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.

32. Some of the Group 2 metal halides are covalent and soluble in organic solvents. Among the following metal halides, the one which is soluble in ethanol is
a) $BeCl_2$ b) $MgCl_2$ c) $CaCl_2$ d) $SrCl_2$

33. Which of the following does not show diagonal relationship between beryllium and aluminium?
a) Both BeO and Al_2O_3 are amphoteric in nature
b) Both beryllium and aluminium form polymeric covalent hydrides
c) Both beryllium and aluminium form nitrides with nitrogen which evolve NH_3 with water
d) Both metal carbonates are highly stable

34. A white solid X reacts with dil. HCl to give colourless gas which is used in fire extinguishers. The solid X is
a) NaCl b) CH_3COONa c) Na_2CO_3 d) $NaHCO_3$

35. Which of the following compounds has the lowest rnelting point?
a) $CaCl_2$ b) $CaBr_2$ c) CaI_2 d) CaF_2

36. When sodium reacts with excess of oxygen, the oxidation number of oxygen changes from:
a) 0 to -1 b) 0 to -2 c) -1 to -2 d) No change

37. Two metals X and Y belong to the second group of periodic table. X forms insoluble oxide but soluble sulphate. Y forms a soluble oxide but insoluble sulphate. Hydroxide of metal X is soluble in NaOH while that of metal Y is insoluble in NaOH. What are metals X and Y?
a) X=Be, Y=Ba b) X=Mg, Y=Ca c) X=Ca, Y=Sr d) X=Ba, Y=Mg

38. Match the column I with column II and mark the appropriate choice:

Column I		Column II	
(A)	Quick lime	(i)	CaH_2
(B)	Slaked lime	(ii)	$Ba(OH)_2$
(C)	Baryta water	(iii)	$Ca(OH)_2$

(D)	Hydrolith	(iv)	CaO

a) (A) ⟶ (i), (B) ⟶ (ii), (C) ⟶ (iii), (D) ⟶ (iv) b) (A) ⟶ (iii), (B) ⟶ (ii), (C) ⟶ (i), (D) ⟶ (iv)
c) (A) ⟶ (i), (B) ⟶ (iii), (C) ⟶ (iv), (D) ⟶ (ii) d) (A) ⟶ (iv), (B) ⟶ (iii), (C) ⟶ (ii), (D) ⟶ (i)

39. Which one is the correct statement with reference to the solubility of $MgSO_4$ in water?
a) SO_4^{2-} ions mainly contribute towards hydratior energy b) Sizes of Mg^{2+} and SO_4^{2-} are similar
c) Hydration energy of $MgSO_4$ is higher in comparison to its lattice energy
d) Ionic potential (charge/radius ratio) of Mg^{2+}

40. Which of the following elements is extracted commercially by the electrolysis of an aqueous solution or its compound?
a) Cl b) Br c) Al d) Na

41. A certain compound X imparts a golden yellow flame. When zinc powder is heated with concentrated solution of X, H_2 gas is evolved. X combines with CO_2 to give a salt Y. Y is a hydrated salt which on reaction with HCl or excess of CO_2 gives another salt Z which is an important part of baking powder. Identify X, Y and Z.

a)

X	Y	Z
HCl	NaOH	$NaHCO_3$

b)

X	Y	Z
KOH	K_2CO_3	$KHCO_3$

c)

X	Y	Z
NaCl	Na_2CO_3	NaOH

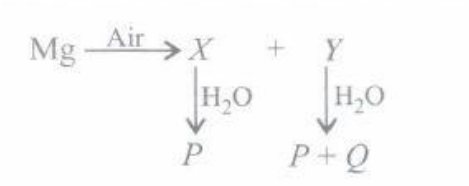
d)

X	Y	Z
NaOH	Na_2CO_3	$NaHCO_3$

42. Which of the following statement is false?
a) Strontium decomposes water readily than beryllium. b) $BaCO_3$ melts at a higher temperature than $CaCO_3$
c) Barium hydroxide is more soluble in water than $Mg(OH)_2$
d) Beryllium hydroxide is more basic than barium hydroxide.

43. The average composition of portland cement is
a) CaO: 40 - 50%, SiO_2: 30 - 40% , Al_2O_3 Fe_2O_3 : 10 - 20%
b) CaO: 50 - 60%, SiO_2 : 20 - 25%, Al_2O_3 : 5 - 10%, MgO : 2 - 3%, Fe_2O_3 : 1 - 2% and SO_3: 1- 2%
c) SiO_2: 40 - 50%, CaO: 30 - 40%, Al_2O_3 : 10 - 20% d) CaO: 50%, SiO_2 : 50%

44. What happens when magnesium is burnt in air and the products X and Yare treated with water?



a)

X	Y	P	Q
MgO	$Mg(OH)_2$	$Mg(OH)_2$	N_2

b)

X	Y	P	Q
MgO	Mg_3N_2	$Mg(OH)_2$	NH_3

c)

X	Y	P	Q
$Mg(OH)_2$	MgO	$Mg(OH)_2$	N_2

d)

X	Y	P	Q
MgO	$Mg(OH)_2$	N_2	$Mg(OH)_2$

45. Which of the following will have lowest value of K_{sp} at room temperature?
a) $Be(OH)_2$ b) $Mg(OH)_2$ c) $Ca(OH)_2$ d) $Ba(OH)_2$

46. The alkali metals are low melting. Which of the following alkali metals is expected to melt if the room temperature rises to 30°C?
a) Na b) K c) Rb d) Cs

47. 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

48. Lithium is the strongest reducing agent though it has highest ionisation energy in its group. Which of the following factors is responsible for making Li the strongest reducing agent?

a) Large heat of atomisation b) Smaller size c) Large sublimation energy
d) Large amount of hydration enthalpy

49. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric filed?
a) Na b) K c) Rb d) Li

50. The decreasing order of the second ionization potential of Mg, Ca and Ba is
a) Mg > Ca > Ba b) Ca > Ba > Mg c) Ba > Mg > Ca d) Mg > Ba > Ca