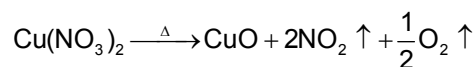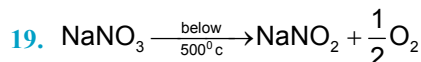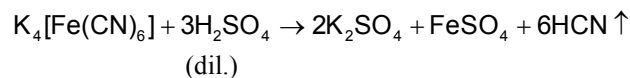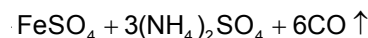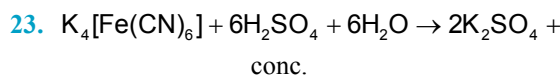# HINTS & SOLUTIONS

EXERCISE - 1
Single Choice

2. The golden yellow colour associated with NaCl to Bunsen flame can be explained on the basis of low ionisation potential of sodium.

3. The solution becomes diamagnetic when concentration of metal increases and electrons are going to become paired up within the solvent cage.

4. **(A)** $CaC_2 + H_2O \rightarrow Ca(OH)_2 + HC \equiv CH \uparrow$

(B) $Be_2C + 2H_2O \rightarrow 2BeO + CH_4 \uparrow$

(C) $Al_4C_3 + 12H_2O \rightarrow 4Al(OH)_3 + 3CH_4 \uparrow$

(D) $Mg_2C_3 + 4H_2O \rightarrow 2Mg(OH)_3 + H_3C - C \equiv CH \uparrow$

5. Ba^{+2} gives green colour in flame test
$BaCrO_4 \rightarrow$ yellow ppt
BaS_2O_3 reacts with dil HCl & produce S (Yellow ppt) & SO_2 pungent smelling gas

6. **(A)** $SiC \Rightarrow$ Covalent carbide.

(B) $Be_2C + 4H_2O \rightarrow 2Be(OH)_2 + CH_4 \uparrow$

(C) $CaC_2 + 2H_2O \rightarrow HC \equiv CH \uparrow + Ca(OH)_2$

(D) $Mg_2C_3 + 2H_2O \rightarrow 2Mg(OH)_2 + H_3C - C \equiv CH \uparrow$

7. $Na(NH_4)HPO_4.4H_2O$(Microcosmic salt) uses in qualitative inorganic analysis for the dry test of basic radicals.

8. $\underset{(A)}{Ca(OH)_2} + \underset{(B)}{Na_2CO_3} \xrightarrow{\Delta} \underset{(C)}{2NaOH} + CaCO_3$

$\underset{(A)}{Ca(OH)_2} \xrightarrow{CO_2} \underset{(C)}{CaCO_3} \downarrow$

9. Milk of magnesia is a suspension of $MgO + H_2O$

11. $\left(\overset{-2}{C} = C = \overset{-2}{C} \right)$ has two sigma and two pi bonds

13. $\underset{(B)}{Ca(NH) + 2H_2O \rightarrow Ca(OH)_2 + NH_3(g)}$

$\underset{(B)}{2NH_3} + 3CaOCl_2 \rightarrow \underset{(C)}{N_2(g)} + 3CaCl_2 + 3H_2O$

$\underset{(C)}{N_2(g)} + 3Mg \rightarrow \underset{(D)}{Mg_3N_2}$

$\underset{(D)}{Mg_3N_2} + 6H_2O \rightarrow 3Mg(OH)_2 + \underset{(B)}{2NH_3}$

15. Acidic salt $NaHCO_3$ and NaOH (base0 react with each other so they cannot exist together in aqueous solution.

18. $BeF_2 + 2NaF \rightarrow Na_2[BeF_4]$

19. $NaNO_3 \xrightarrow[500^0 c]{below} NaNO_2 + \frac{1}{2}O_2$

$Cu(NO_3)_2 \xrightarrow{\Delta} CuO + 2NO_2 \uparrow + \frac{1}{2}O_2 \uparrow$

22. $\rightarrow Na_2CO_3$ precipitates out Ca^{++} and Mg^{++} from hard water as insoluble carbonates

$\rightarrow$ Calgon;$(NaPO_3)_6$; exchanges Ca^{++} and Mg^{++} from hard water

$\rightarrow$ Permutit : common type of zeolite, it exchanges Ca^{++} and Mg^{++} from hard water with its Na^+ and also does not allow to pass large sized molecules from it.
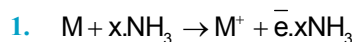
23. $K_4[Fe(CN)_6] + 6H_2SO_4 + 6H_2O \rightarrow 2K_2SO_4 +$
conc.
$FeSO_4 + 3(NH_4)_2SO_4 + 6CO \uparrow$

$K_4[Fe(CN)_6] + 3H_2SO_4 \rightarrow 2K_2SO_4 + FeSO_4 + 6HCN \uparrow$
(dil.)

24. $NaOH + CuSO_4 +$ sodium (M_1) tartarate solution is known as Fehling solution and is used in the detection of -CHO group

25. Milk of magnesia is a suspension of $MgO + H_2O$

EXERCISE - 2
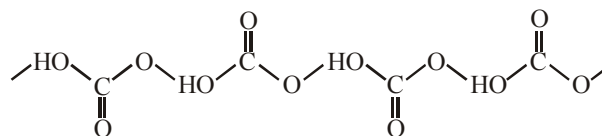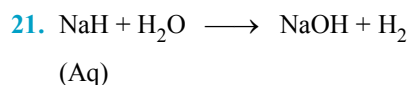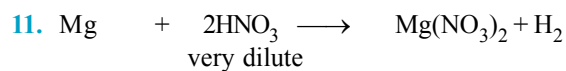### Part # I : Multiple Choice

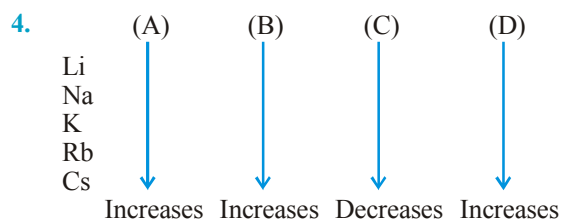**1.** $M + x.NH_3 \rightarrow M^+ + \overset{-}{e}.xNH_3$
Ammoniated electron
responsible for blue colour

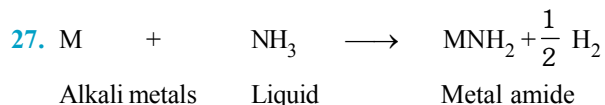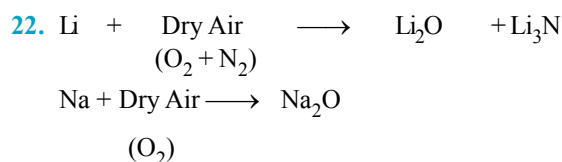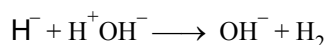**2.** Thermal stability of Nitrates of alkali metals
$LiNO_3 < NaNO_3 < KNO_3 < RbNO_3 < CsNO_3$
Metal carbonate solubility
$Li_2CO_3 < Na_2CO_{34} < K_2CO_{34} < Rb_2CO_3 < Cs_2CO_3$
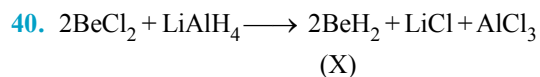Only $NaHCO_3$ is insoluble in water due to association of HCO_3^- by intermolecular H-bonding

3. Be, Sn and Ga are amphoteric metals
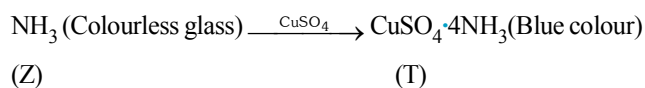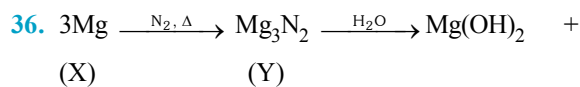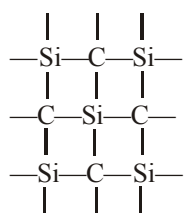
4.

(A)	(B)	(C)	(D)

Li
Na
K
Rb
Cs

Increases Increases Decreases Increases

11. $Mg + 2HNO_3 \longrightarrow Mg(NO_3)_2 + H_2$
very dilute

21. $NaH + H_2O \longrightarrow NaOH + H_2$

(Aq)

OR

$H^- + H^+OH^- \longrightarrow OH^- + H_2$

22. $Li + Dry\ Air \longrightarrow Li_2O + Li_3N$
$(O_2 + N_2)$

$Na + Dry\ Air \longrightarrow Na_2O$
(O_2)

27. $M + NH_3 \longrightarrow MNH_2 + \dfrac{1}{2} H_2$

Alkali metals   Liquid   Metal amide

33. CaC_2, Al_4Cl_3 and Be_2C are ionic carbides but SiC are covalent.

```
    |   |   |
 —Si—C—Si—
    |   |   |
 —C—Si—C—
    |   |   |
 —Si—C—Si—
    |   |   |
```

36. $3Mg \xrightarrow{N_2,\,\Delta} Mg_3N_2 \xrightarrow{H_2O} Mg(OH)_2 +$
(X)   (Y)

NH_3(Colourless glass) $\xrightarrow{CuSO_4}$ $CuSO_4 \cdot 4NH_3$(Blue colour)

(Z)   (T)

40. $2BeCl_2 + LiAlH_4 \longrightarrow 2BeH_2 + LiCl + AlCl_3$
(X)

49. $CsBr_3$ is an ionic compound so exist as $Cs^+ Br_3^-$

52. $2Na + Al_2O_3 \xrightarrow{High\ temperaturte} 2NaAlO_2 \xrightarrow[water]{CO_2\ in}$
$Na_2CO_3 + Al(OH)_3$
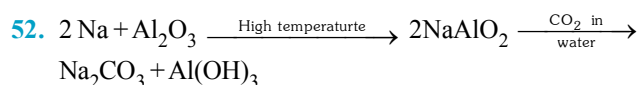
<table><tr><td colspan="2">Part # II : Assertion & Reason</td></tr></table>

8. $Mg^{2+} + ZnSO_4 \rightarrow MgSO_4 + Zn^{++}$. It is not metal Displacement reaction in which more active metal displaces less active metal from its salt solution

9. $2Mg + CO_2 \xrightarrow{\Delta} 2MgO + C$
Mg is a strong reducing agent & have great affinity for O_2 at high temperature.

10. (A) Ionic radius of NH_4^+ is almost equal to ionic radius of K^+

11. Statement - I is false, statement - II is true

12. Among sulphate salt of alkali metals only Li_2SO_4 does not forms alum, as Li^+ has very small size. Li_2SO_4 Li forms Li_2NH with NH_3 gas.

**13.** $BeCl_2$ can be easily hydrolysed due to its e-deficient nature

$$BeCl_2 + 2H_2O \rightarrow Be(OH)_2 + 2HCl \uparrow$$
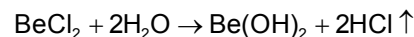
EXERCISE - 4

<table><tr><td>Subjective Type</td></tr></table>

1. (i) $Na_2O_2 +_2 H_2O \rightarrow 2NaOH + H_2O_2$

(ii) $KO_2 + H_2O \rightarrow KOH + H_2O_2 + O_2$

(iii) $2Na_2O_2 + 2CO_2 \rightarrow 2Na_2CO_3 + O_2$

2. $A = Ca,$ $B = Ca_3N_2$ $C = Ca(OH)_2$ $D = NH_3$

3. In presence of HF, F^- is converted into difluoride ion HF^-_2, allowing further dissolution of solid LiF.

4.
$$CuSO_4 + Na_2S_2O_3 \rightarrow CuS_2O_3 + Na_2SO_4$$
$$2CuS_2O_3 + Na_2S_2O_3 \rightarrow CuS_2O_3 + Na_2S_4O_6$$

Cupric thiosulphate

$$3Cu_2S_2O_3 + 2Na_2S_2O_3 \rightarrow Na_4[Cu_6(S_2O_3)_5]$$

Sodium cuprothiosulphate.

5. (i) $BeSO_4 < MgSO_4 < CaSO_4$
(ii) $Ca^{2+} < MG^{2+} < Be^{2+}$
(iii) $Be(OH)_2 < Mg(OH) < Ca(OH)_2$
(iv) $CaCl_2 < MgCl_2 < BeCl_2$
(v) $CaCl_2 < MgCl_2 < BeCl_2$
(vi) $BaF_2 < CaF_2 < MgF_2$
(vii) $Ba^{2+} < Mg^{2+} < Be^{2+}$
(viii) $BaF_2 < MgF_2 < BeF_2$
(ix) $Be < Mg < Ca < Sr$

6. **(i)** Ca gives brick red colour to flame

(ii) $Ca + H_2 \rightarrow CaH_2$ (hydrolith, trade name)

   (A)   **(B)**

(iii) $CaH_2 + 2H_2O \rightarrow Ca(OH)_2 + 2H_2$

   (B)   **(C)**

7. **(i)** Insoluble $CaSO_4$ is formed which deposists on the surface of marble and prevents further action of dilute H_2SO_4, so the evolution of CO_2 ceases after sometime.

(ii) Insoluble $CaCO_3$ is first precipitated which dissolves in excess of CO_2 due to the form of $Ca(HCO_3)_2$.

$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O;$

(Insoluble)

$CaCO_3 + H_2O + CO_2 \rightarrow Ca(HCO_3)_2$

(Soluble)

(iii) Metallic bonding is much stronger in alkaline earth metals as twwo electrons are present in valence shell.

(iv) The outermost energy shell in beryllium is the second. It cannot accommodate more the 8 electrons and hence a covalency limit 4 cannot be exceeded.

8. PbO2 are amphoteric nature

$PbO_2 + 4HCl \rightarrow PbCl_4 + 2H_2O$

$PbO_2 + 2NaOH \rightarrow Na_2PbO_3 + H_2O$

9. **(i)** $3I_2 + 6NaOH \rightarrow 5NaI + NaIO_3 + 3H_2O$

(ii) $P_4 + 3NaOH + 3H_2O \rightarrow PH_3 + 3NaH_2PO_2$

(iii) $ZnSO_4 + 2NaOH \rightarrow Zn(OH)_2 + Na_2SO_4$

ppt

(iv) $AlCl_3 + 3NaOH \rightarrow Al(OH)_3 + 3NaCl$

ppt

$Zn(OH)_2 + 2NaOH \rightarrow Na_2[Zn(OH)_4]$

$Al(OH)_3 + NaOH \rightarrow Na[Al(OH)_4]$

or

$NaAlO_2$

10.

$2KO_2 + S \rightarrow K_2SO_4 \xrightarrow[aq.]{Al_2(SO_4)_3} K_2SO_4.Al_2(SO_4)_3.24H_2O$

(A)   **(B)**   **(C)**

11. **(i)** $Na_2O_2 + 2H_2O \rightarrow 2NaOH + H_2O + [O]$

$[O] + Litmus \rightarrow$ White (bleaching)

Red

(ii) The other compound Na2O will give NaOH on dissolution in water. The red litmus will turn to blue.

12. **(i)** $Zn + 2NaOH \rightarrow Na_2ZnO_2 + H_2$

(X)

(ii) (X) is also justified by step 2 reactions :

$2NaOH + SnCl_2 \rightarrow Sn(OH)_2 + 2NaCl$

(X)   White ppt.

$2n(OH)_2 + 2NaOH \rightarrow Na_2SnO_2 + 2H_2O$

(Excess) Soluble

(X)

13. The gas **(A)** on treatment with but-2-ene followed by treatment with Zn/H_2O yields acetaldehyde and thus **(A)** is ozone

(i)

$O_3 + CH_3 - CH = CH - CH_3 \rightarrow CH_3 - CH - O - CH - CH_3$

| |

O---------O

Mono ozonide

$2CH_3CHO \xleftarrow[Zn]{H_2O}$

Acetaldehyde

(ii) $5O_3 + 2KOH \rightarrow 2KO_3 + H_2O(g) + 5O_2$

(A)   Potassium ozonide   **(C)**

Deep red **(B)**

14. The given facts suggest M to be potassium (K) and (X) to be bromine (Br_2).

$2K + Br_2 \rightarrow 2KBr$

(Ionic solid with m. pt. $734^0 C$)

15. Be

16. **(a)** E and G   **(b)** C, E and G   **(c)** G

(d) A and D   **(e)** B

17. $SrSO_4 > CaSO_4 > MgSO_4 > BeSO_4$

18. $A = Mg$, $B = Mg_3N_2$, $C = Mg)OH)_2$, $D = NH_3$ **(A)** may be Ca or Ba

19. $A = Na_2S_2O_3$, $B = I_2$; $C = Ag_2S$, $D = [Fe(S_2O_3)_2]^-$, $E = Na_4[Cu_6(S_2O_3)_5]$

20. **(A)** $= O_3$, **(B)** $= KO_3$, **(C)** $= O_2$

21. **(A)** $= KO_2$; $B = K_2SO_4$ **(C)** $= K_2SO_4)_3.24H_2O$

22. $NiO < MgO < SrO < K_2O < Cs_2O$

23. $[X] = NaOH$

24. $CsI < RbI < KI < NaI < LiI$

25. It is a cyclic structure having six P-O-P linkages.

26. $A = NaHSO_3$, $B = Na_2SO_3$, $C = Na_2S_2O_3$, $D = Na_2S_4O_6$

27. $(CH_3COO)_2$ Ca shows exothermic dissolution whereas $Pb(NO_3)_2$ shows endothermic dissolution. According to Le-chatellier principle the solubility of $(CH_3COO)_2$ Ca decreases and solubility of $Pb(NO_3)_2$ increases with temperature.

28. $BeCl_2$ is salt of weak base $Be(OH)_2$ and strong acid HCl and thus undergoes hydrolysis to result in an acidic solution in water

$$BeCl_2 + H_2O \xrightarrow{\text{hydration}} [Be(H_2O)_2]^{2+} + 2Cl^-$$
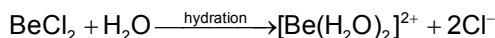
Beryllium chloride is acidic when dissolved in pure water because the hydrated ions hydrolyses, producing H_3O^+. The Be^{2+} ions are easily hydrated first because of high charge-size ratio. The hydrolysis happens because the Be-O bond is very strong and so in the hydrated ion this weakens the O-H bonds hence there is a tendency to lose protons.

$$[Be(H_2O)]^{2+} + H_2O \xrightarrow{\text{hydration}} [Be(H_2O)_3 OH]^+ + H_3^+ O$$
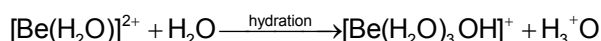
29. **(i)** Na_2O_2 is powerful oxidant and bleacing agent and bleaches red litmus paper to white in aqueous solution state.
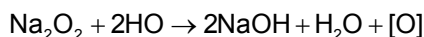
$$Na_2O_2 + 2HO \rightarrow 2NaOH + H_2O + [O]$$

(ii) The other compound Na2O will give NaOH on dissolution in water. The red litmus will turn to blue.

30. Ag^+; because Ag+ has pseudo noble gas configuration which makes it more polarising and therefore stronger acid.

31. Alkaline earth metals have smaller size and more nuclear charge. So higher degree of hydration.

EXERCISE - 5
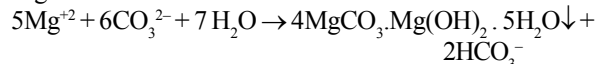
7. $BeSO_4$ is only the soluble sulphate because its hydration energy more than its lattice energy. rest of all are ppt.

8. $Li + O_2 \longrightarrow Li_2O$ (Normal oxide)
$Na + O_2 \longrightarrow Na_2O_2$ (Per oxide)
$K + O_2 \longrightarrow KO_2$ (Super oxide)

9. Mg can form basic carbonate like
$$5Mg^{+2} + 6CO_3^{2-} + 7H_2O \rightarrow 4MgCO_3.Mg(OH)_2.5H_2O\downarrow + 2HCO_3^-$$
While Li can form only carbonate (Li_2CO_3) not basic carbonate.

10. $[3Ca_3(PO_4)_2.Ca(OH)_2] + 2F^\ominus \longrightarrow$

(dringking water upto 1ppm)

$[3Ca_3(PO_4)_2.CaF_2] + 2OH^\ominus$
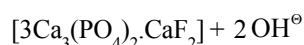
(Harder teeth enamel)

2. Blue solution to the presence of solvated/ammonated e⁻

3. NH_4NO_3 or $NH_4NO_2 + NaOH \rightarrow NH_3$ (non flammable gas) $+ H_2O + NaNO_3$
Zn react with this solution & produce nacent hydrogen which can reduce NO_3^-/NO_2^- in ammonia.

4. White phosphorus (P_4) on reaction with NaOH gives PH_3 (Oxidation state of phosphorus is -3) & NaH_2PO_2 (oxidation state of phosphorus is +1). This reaction is type of disproportionation reaction.

5. Aqueous solution of $Na_2S_2O_3$ on reaction with Cl_2 gives $NaHSO_4$
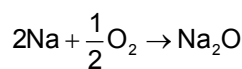
6. $2Na + \dfrac{1}{2}O_2 \rightarrow Na_2O$
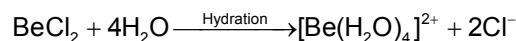$2Na + O_2 \rightarrow Na_2O_2$ $\Big\}$ Parallel reaction takes place

Subjective Type

1. $A = NaHSO_3$, Oxidation state of $S = +4$
$B = Na_2SO_3$, Oxidation state of $S = +4$
$C = Na_2S_2O_3$, Oxidation state of $S = +6\ \&-2$
$D = Na_2S_4O_6$, Oxidation state of $S = +5\ \&\ 0$

2. $BeCl_2$ is a salt of weak base $Be(OH)_2$ and strong acid HCl and thus undergoes hydrolysis to result in an acidic solution in water.

$$BeCl_2 + 4H_2O \xrightarrow{\text{Hydration}} [Be(H_2O)_4]^{2+} + 2Cl^-$$

3. Alkaline earth metals have smaller size and more nuclear charge.

4. $SrSO_4 > CaSO_4 > MgSO_4 > BeSO_4$

5. $(CH_3COO)_2$ Ca shows exothermic dissolution whereas $Pb(NO_3)_2$ show endothermic dissolution.

6. The dissociation of NH_4OH (a weak electrolyte) is suppressed in presence of NH_4Cl due to common ion effect. Thus, [OH-] in solution becomes low. The ionic product of concentrations of Mg^{2+} andOH^- ions does not exceed the solubility product of $Mg(OH)_2$ and thus $Mg(OH)_2$ is not precipitated.

1. **(A), (C)** and decreases down the group but **(B)** increases down the group with increasing metallic character.

2. Basic strength of the oxides increase in the order $Li_2O < Na_2O < K_2O < RB_2O < Cs_2O$. The increase in basic

strength is due to the decrease in I.E. and increase in electropositive character.
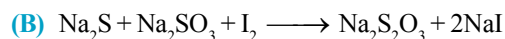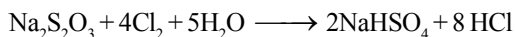
The melting points of the halides decrease in the order $NaF > NaCl > NaBr > NaI$, as the size of the halide ion increases. The decrease in melting point is due to increase the covalent character with increase in the size of anion according to Fajan's rule.

3. The atom becomes larger on descending the group, so the bonds are weaker (metallic bond), the cohesive force/ energy decreases and accordingly melting point also decreases.

4. Down the group in IIA group basicity increases with increase in metallic character.

5. The thermal stability of oxo-stalts of alkali and alkaline earth metals increase with increasing metallic character (i.e. with decreasing ionisation energies).

6. $4KO_2 + 4CO_2 + 2H_2O \xrightarrow{1000°C} 2K + CaF_2 + 2C$

7. $4NaNO_3 \xrightarrow{800°C} 2Na_2O + 5O_2 + 2N_2$.

8. $3Mg + N_2 \xrightarrow{\Delta} Mg_3N_2$;
   (X)   (Y)
   $Mg_3N_2 + 6H_2O \longrightarrow 3Mg(OH)_2 + 2NH_3$ (colourless gas)
   $CuSO_4 + 4NH_3 \longrightarrow [Cu(NH_3)_4]SO_4$ (blue colour)

9. **(A)**, **(B)** and **(D)** are correct statements.
   (C) Alkali metals have low melting points. They have larger atomic size and one valence electron per atom for the formation of metallic bond. This causes weakr metallic bonds.

10. **(D)** Hydration energy $\propto \dfrac{Charge\ on\ cation}{Size\ of\ cation}$

    (A), **(B)** and **(C)** are correct statements.

11. $M + (x+y)NH_3 \longrightarrow [M(NH_3)_x]^+ + [e(NH_3)_y]^-$. Blue colour of the solution is due to ammoniated electrons and good conductor of electricity is be cause of both ammoniated cations and ammoniated electrons.

12. For solubility, hydration energy > lattice energy.

13. **(A)** Marcasite structures at −50°C, pyrite structure between −77°C and −50°C, calcium carbide structure at room tempt.
    (B) $2Na_2S + 2O_2 + H_2O \longrightarrow Na_2S_2O_3 + 2NaOH$
    (C) $2Na_2S + H_2O \longrightarrow NaSH + NaOH$
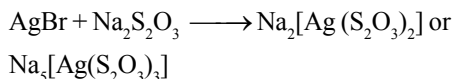   **(D) Wrong** : The lattice energy decreases more rapidly

than the hydration energy and so their solubility increases fro, Li to Cs and Be to Ba.

15. Potassium and caesium have low ionsation energies and therefore, their valence shell electrons can be easily eject off by the energy of light.

16. $2M + H_2 \longrightarrow 2\overset{+}{M}\overset{-}{H}$

17. **(A)** Down the group the decrease in lattice energy is more as compared to that of hydration energy with increase in size of cations. So the solubility order is correct. Similary the thermal stability of the oxo-salts increases with increase in metallic character. So the thermal stability order is correct.
    (B) The correct order of solubility if $MgSO_4 > CaSO_4 > SrSO_4$ as in this case decrease in hydration energy is more as compared to that of lattice energy.
    (C) Down the group strength of metallic bond decreases. Due to this there occurs a decrease in close packing of atoms in crystal lattice from Li to Cs and thus softness increase down the group.
    (D) Hydration energy $\propto \dfrac{1}{Size\ of\ atom}$
    So Be > Mg > Ca is correct order.

18. **(A)** $NaSO_4 + C + CaCO_3 \longrightarrow Na_2CO_3(sp^2) + CaSO_4(sp^3)\downarrow$ (White)
    (B) $NaCl + NH_4.HCO_3 \longrightarrow NaHCO_3(sp^2)\downarrow$ (White) $+ NH_4Cl(sp^3)$
    (C) $Na_2CO_3 + Ca(OH)_2 \longrightarrow CaCO_3(sp^2)\downarrow$ (White) $+ NaOH$
    (D) $2KOH + 4NO \longrightarrow 2KNO_2(sp^2) + N_2O + H_2O(sp^3)$
    If $4KOH + 6NO \longrightarrow 4KNO_2 + N_2 + 2H_2O$

19. The thermal stabilities of carbonates increase down the group due to increase in metallic character i.e. electropositive character. Further bigger cation stabiliese bigger anion through crystal lattice energy effects.

20. $M + (x+y)NH_3 \longrightarrow [M(NH_3)_x]^+ + [e(NH_3)y]^-$

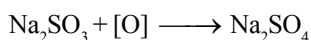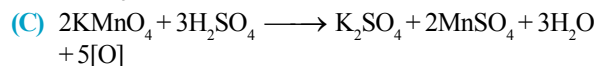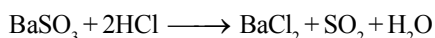21. Sodium carbonate is prepared by solvay process not potassium carboante, as $KHCO_3$ is quite soluble in water.

22. (A) $Na_2S_2O_3$ is used to remove the chlorine from the surface of fibres

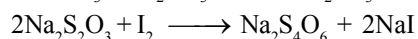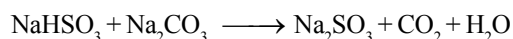$$Na_2S_2O_3 + 4Cl_2 + 5H_2O \longrightarrow 2NaHSO_4 + 8\,HCl$$

(B) $Na_2S + Na_2SO_3 + I_2 \longrightarrow Na_2S_2O_3 + 2NaI$

(C) Unreduced AgBr forms soluble complex with hypo that is with $Na_2S_2O_3$

$$AgBr + Na_2S_2O_3 \longrightarrow Na_2[Ag\,(S_2O_3)_2]\ or$$
$$Na_5[Ag(S_2O_3)_3]$$

23. (B) $Na_2SO_3 + Ba^{2+} \longrightarrow BaSO_3 \downarrow (White) + 2Na^+$

$$BaSO_3 + 2HCl \longrightarrow BaCl_2 + SO_2 + H_2O$$

(C) $2KMnO_4 + 3H_2SO_4 \longrightarrow K_2SO_4 + 2MnSO_4 + 3H_2O$
$+ 5[O]$

$$Na_2SO_3 + [O] \longrightarrow Na_2SO_4$$

24. $Na_2CO_3 + SO_2 \xrightarrow{\ H_2O\ } NaHSO_3 + CO_2$

$$NaHSO_3 + Na_2CO_3 \longrightarrow Na_2SO_3 + CO_2 + H_2O$$
$$2Na_2S_2O_3 + I_2 \longrightarrow Na_2S_4O_6 + 2NaI$$
$$P = (NaHSO_3)\ O.S = +4\ ;\ Q = (Na_2SO_3)\ O.\ S = +4.\ ;$$

$$R = (Na_2S_2O_3)\ O.S = +2\ ;\ S = (S_4O_6^{2-})\ O.\ S = +\frac{5}{6}$$

25. Here solvated electrons acts as a reducing agent.

26. $4\,KO_2 + 3CO_2 \longrightarrow 2K_2CO_3 + 3O_2$

27. (A) $M_2O + H_2O \longrightarrow 2MOH$

(B) $M_2O_2 + H_2O \longrightarrow 2MOH + 1/2\,O_2$

(C) $2MO_2 + 2H_2O \longrightarrow 2MOH + H_2O_2 + O_2$
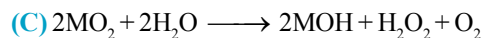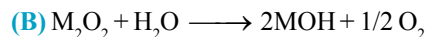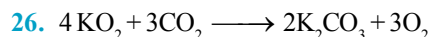
28. Dilute solution of Na metal in liquid ammonia is deep blue colourd and highly conducting and paramagnetic in nature because of solvated cations and solvated electrons.

$$M + (x + y)\,NH_3 \longrightarrow [M\,(NH_3)_x]^+ + [NH_3)_y]^-$$