$Ba^{+2}CO_3^{-2} + H^+ - OH \longrightarrow Ba(OH)_2 + H_2CO_3$

$A + B \longrightarrow C + D$

$BaCO_3 + HNO_3 \longrightarrow Ba(NO_3)_2 + H_2CO_3$

this reaction is possible when used acid is stronger than the acid from which salt is prepared and formed products are soluble.

$$BaCO_3 + HCl \longrightarrow BaCl_2 + H_2CO_3$$

$$BaCO_3 + CH_3COOH \longrightarrow Ba(CH_3COO)_2 + H_2CO_3$$

	K_a
H_2CO_3	4.3×10^{-7}
CH_3COOH	1.79×10^{-5}
HCN	4.79×10^{-10}
H_3BO_3	5.8×10^{-10}

Solubility $\Rightarrow$ all simple salts are soluble

except Ag^+ | Hg_2^{+2} | Cu_2^{+2}

White ppt

of $BaCO_3$ ⇒ Soluble in dil HNO_3, dil HCl and CH_3COOH

ppt

$A + B \longrightarrow C + D$

TiO_2

$A + B \longrightarrow C + D$

$BaS + ZnSO_4 \longrightarrow BaSO_4 + ZnS$

Lithophone
(White pigment)

$2PbCO_3 \cdot Pb(OH)_2$
White lead

$\xrightarrow{H_2S}$ PbS (Black)

$$\overset{\times}{AgCl} + \overset{\checkmark}{Na_3AsO_3} \rightleftharpoons \overset{\wedge}{Ag_3AsO_3} + \underset{\smile}{3NaCl}$$

(White ppt.) (yellow ppt.)

Note ⇒ all CO_3^{-2} are insoluble

except IA / $(NH_4)_2CO_3$

↓

Li_2CO_3 (S.S)

Hg → salt & are pois.

Hg_2Cl_2
(Calomel)

$HgCl_2$
(Corrosive Sublimate)

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Redox

Li
K
Ca
Na
Mg
Al
Mn
Zn
Cr
Fe
Cd
Co
Ni
Sn
Pb
H
Cu
Hg
Ag
Au

oxid. pot ↑

down the series Red. pot. ↑

$Mn + CuSO_4 \longrightarrow MnSO_4 + Cu$ (✗)

$Cu + ZnSO_4 \longrightarrow CuSO_4 + Zn$ (✓)

Redox Reaction depends upon electrod potential which also depends upon following factors

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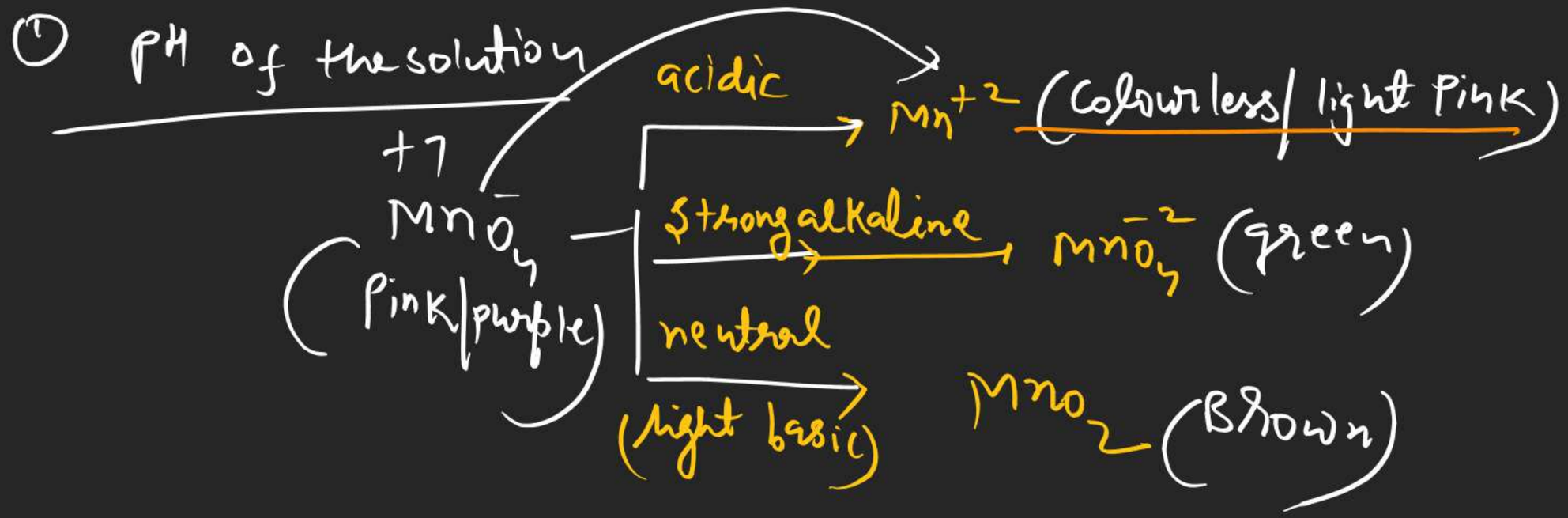
1. pH of the solution
2. Temp.
3. Conc. of oxidising agent and Reducing agent.
4. Pressure

① pH of the solution



★ Which of the following cation is colourless

(a) $Mn^{+2} = 3d^5$

(b) $Cr^{+3} = 3d^3$

(c) $Co^{+2} = 3d^7$

(d) $Ti^{+4} = 3d^0$ [Colourless]

$Ti = \boxed{3d^2 4s^2}$

Temp.

$$Na + H^+ - OH \xrightarrow{\text{cold}} NaOH + H_2$$

(S·R·A) (W·O·A)

$$Mg + H^+ - OH \xrightarrow{\text{(warm)}} Mg(OH)_2 + H_2$$

$$Li \longrightarrow Li^+$$

(S·R·A) ≡ W·O·A

$$H \longrightarrow H^+$$

(S·R·A) (W·O·A)

Li
K
Ca
Na
Mg
Al
Mn
Zn
Cr
Fe
Cd
Co
Ni
Sn
Pb
H
Cu
Hg
Ag
Au

$Zn + H^+-\bar{O}H \xrightarrow{hot} Zn(OH)_2 + H_2$

$Fe + H-OH \xrightarrow{Steam} Fe_3O_4 + H_2$

$B + H^+-\bar{O}H \xrightarrow{Cold} X$

$\xrightarrow{hot} X$

$B + H^+-\bar{O}H \xrightarrow[(Red\ hot)]{} B_2O_3 + H_2$

$Si + H^+-\bar{O}H \xrightarrow[(Red\ hot)]{} SiO_2 + H_2$

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(3) Conc. of oxidising agent and Reducing agent

SO_4^{-2}

$x + 4(-2) = -2$

$x = +6$

$Zn + dil.H_2SO_4 \longrightarrow ZnSO_4 + H_2$

(Pref. O.A)

$Zn + Conc.H_2SO_4 \longrightarrow ZnSO_4 + SO_2$

(Pref O.A)

(O.A) $H^+ \rightarrow {}^{0}H_2$

$+6S^{-2}O_4$ (O.A) $\rightarrow {}^{+4}SO_2$

$$Zn + \underline{dil\ HCl} \longrightarrow ZnCl_2 + H_2$$

$$Zn + \underline{Conc.\ HCl} \longrightarrow ZnCl_2 + H_2$$

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oxidising acid ⇒ acid in which anionic part act as oxidising agent

example :→ Conc. H_2SO_4, Conc. HNO_3 (70%)
dil HNO_3 (20%), very dil HNO_3 (6%)

non oxidising acid :→ acid in which anionic part does not act as oxidising agent.

dil HCl, Conc. HCl, dil H_2SO_4, Conc. H_3PO_4

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Li
K
Ca
Na
Mg
Al
Mn
Zn
Cr
Fe
Cd
Co
Ni
Sn
Pb
H_2
Cu
Hg
Ag
Au

Metal (Element above H_2) + non oxidising acid. $\longrightarrow$ H_2

Element (below H_2) + non oxidising acid $\longrightarrow$ ×

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$$Ag + Conc.HCl \xrightarrow{boil}$$

Q. Which of the following reaction is possible

(1) $Cu + HCl \longrightarrow$

(2) $Zn + HCl \longrightarrow$

(3) $Ag + HCl \longrightarrow$

(4) all are possible

(5) all are not possible