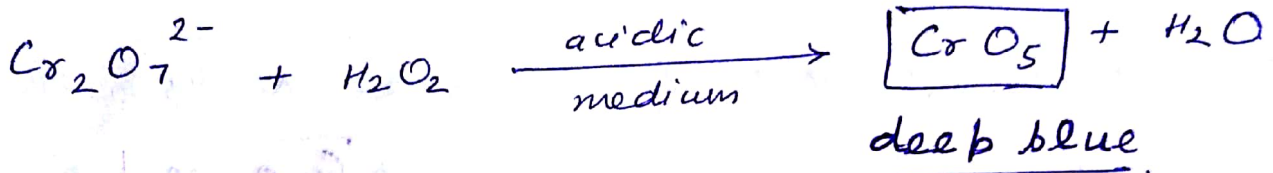
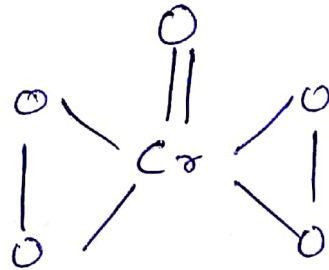


④ \*\*\*  
Rxn. with  $H_2O_2$

When  $Cr_2O_7^{2-}$  (dichromate ions) are treated with  $H_2O_2$  in acidic medium then due to formation of  $CrO_5$  (chromic peroxide) color of solution becomes deep blue.



Str. of  $CrO_5$  :-

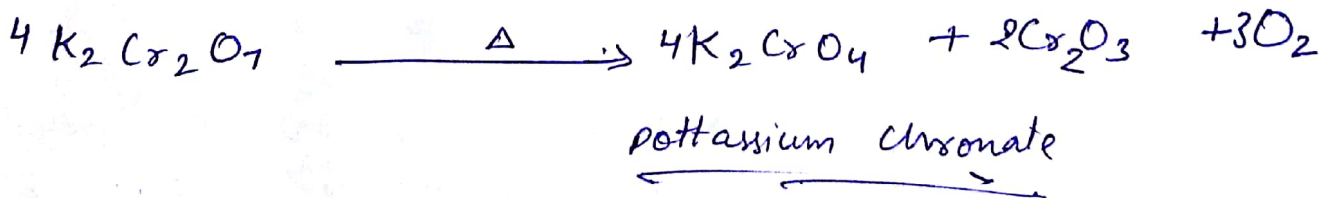


butter fly like str.



⑤ Action of heat :-

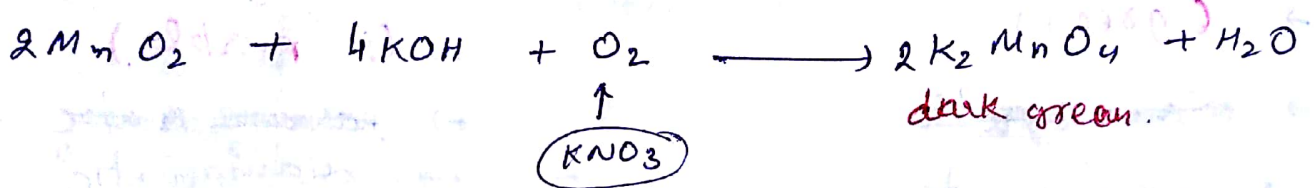
When  $K_2Cr_2O_7$  is strongly heated then it decomposes to  $K_2CrO_4$



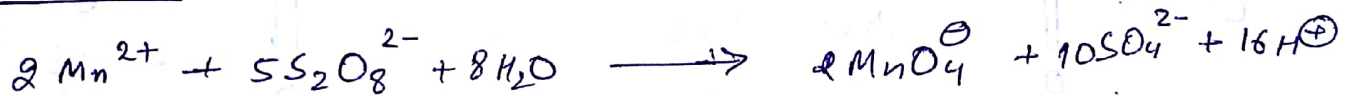
\*\*  
⑥  $K_2Cr_2O_7$  is used in volumetric analysis instead of  $Na_2Cr_2O_7$  because of its hygroscopic nature.

## Potassium Permanganate (KMnO<sub>4</sub>): ⑦

It is prepared by fusion of MnO<sub>2</sub> with an alkali metal hydroxide and an oxidising agent like KNO<sub>3</sub>. This produces dark green K<sub>2</sub>MnO<sub>4</sub> which disproportionates in neutral or acidic medium to give permanganate.

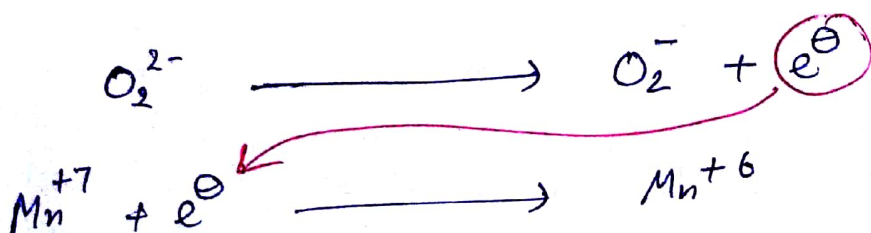


### preparation II



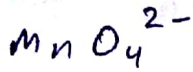
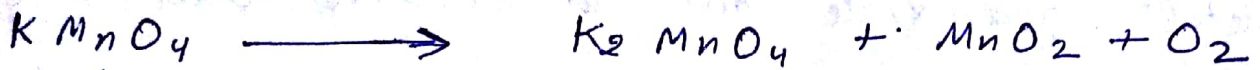
### Properties :-

- ① It is dark purple in color.
- ② It is paramagnetic.  
KMnO<sub>4</sub> do not have unpaired e<sup>⊖</sup> but it is colored due to a special phenomenon charge transfer spectrum (CTS)



Oxygen transfer its e<sup>⊖</sup> to Mn

③ On heating it decomposes to manganate ( $MnO_4^{2-}$ ) and ~~permanganate~~ ( $MnO_4^-$ )  $MnO_2$  & Manganese dioxide

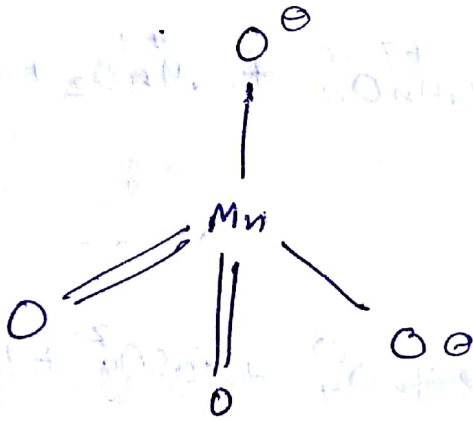


manganate

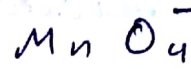
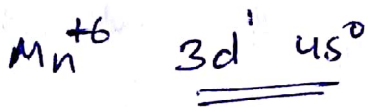
→ (green)

→ ~~diamagnetic~~

→ paramagnetic



tetrahedral

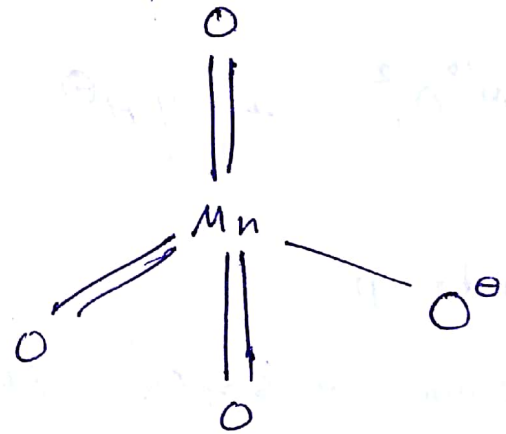


permanganate

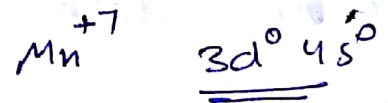
→ (purple)

→ ~~paramagnetic~~

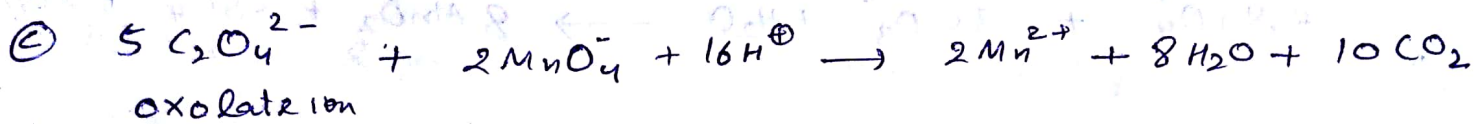
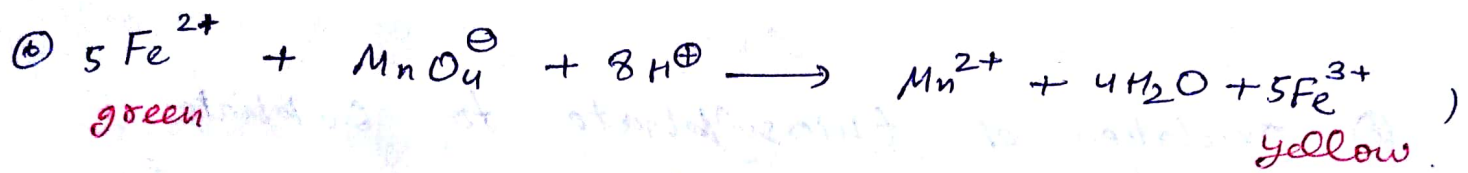
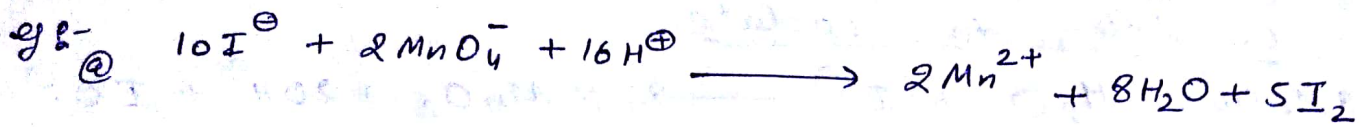
→ diamagnetic



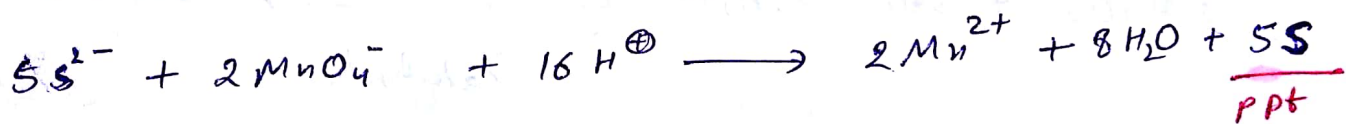
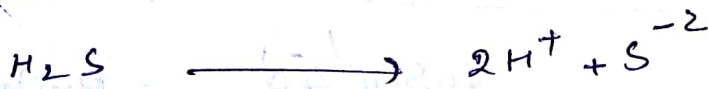
tetrahedral



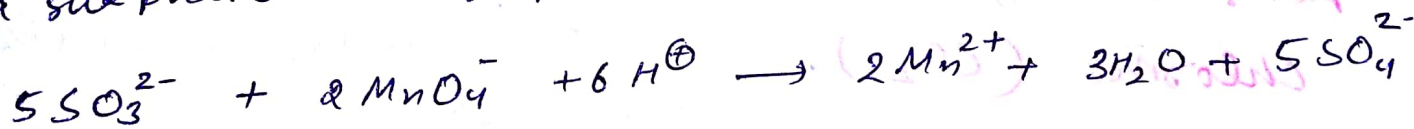
(4) It act as good oxidising agent in acidic <sup>(8)</sup>  
medium.



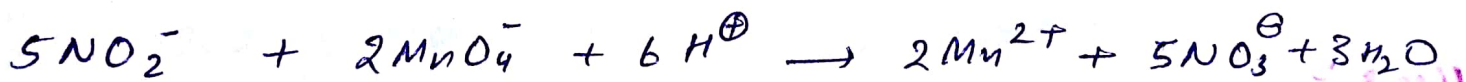
(d) oxidation of  $H_2S$



(e) Sulphurous acid or sulphite is oxidised to  
a sulphate or sulphuric acid

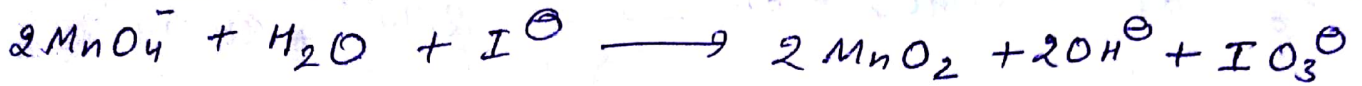


(f) Nitrite is oxidised to Nitrate

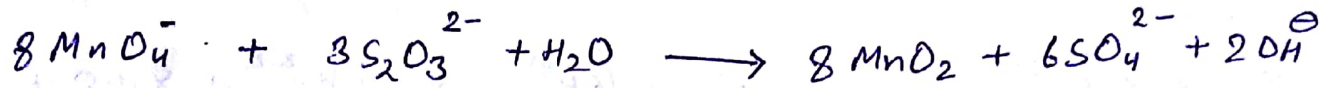


⑤ Oxidation by  $\text{KMnO}_4$  in neutral or slightly alkaline medium.

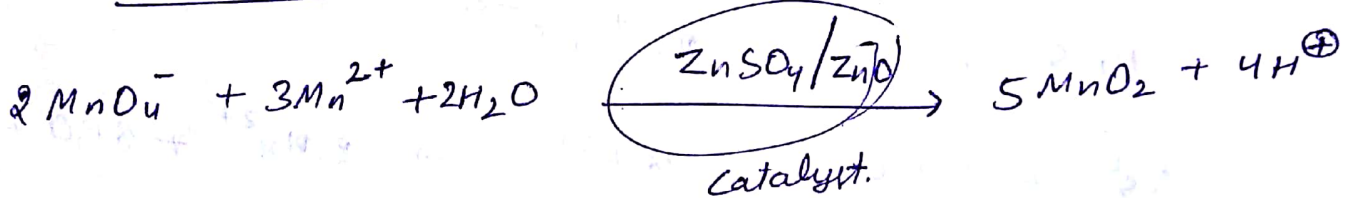
⑥ iodide to iodate



⑦ Oxidation of tetrathionate to sulphate



⑧ Manganous salt to  $\text{MnO}_2$



Note:- titration of permanganate is not done in presence of HCl because it oxidise HCl to chlorine ( $\text{Cl}_2$ ).

Uses:-

- strong oxidising agent in organic chemistry
- used in bleaching of wool, cotton, silk etc.

some important points regarding d block elements <sup>(a)</sup>

- ① Bayer's Reagent  $\Rightarrow$  1% alkaline solution of  $KMnO_4$
- ② Etard's Reagent  $\Rightarrow CrO_2Cl_2$  (chromyl chloride)
- ③ Barfoed's Reagent  $\Rightarrow Cu(CH_3COO)_2 + CH_3COOH$
- ④ Fenton's Reagent  $\Rightarrow FeSO_4 + H_2O_2$
- ⑤ <sup>\*\*</sup> Luca's Reagent  $\Rightarrow$  Anhyd.  $ZnCl_2 +$  'conc.'  $HCl$ .
- ⑥ Titanox  $\Rightarrow$  mix of  $TiO_2 + BaSO_4$   
 $\hookrightarrow$  it is white coloured pigment.
- ⑦ philosopher wool  $\Rightarrow ZnO$
- ⑧ Rinman's green  $\Rightarrow CoO \cdot ZnO$   
 $\hookrightarrow$  it is green coloured pigment.
- ⑨
  - ① Blue vitrol  $\Rightarrow CuSO_4 \cdot 5H_2O$
  - ② <sup>\*\*</sup> Green vitrol  $\Rightarrow FeSO_4 \cdot 7H_2O$
  - ③ White vitrol  $\Rightarrow ZnSO_4 \cdot 7H_2O$
- ⑩ ① Brown's catalyst  $\Rightarrow$  Nickel Boride
- ② Permanganic acid  $\Rightarrow HMnO_4$

⑪ Corrosive sublimate  $\text{HgCl}_2$

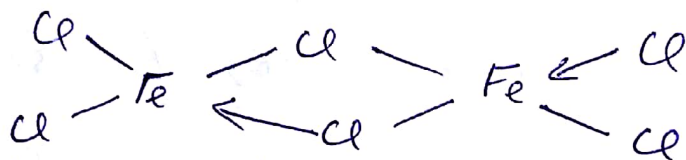
\* ⑫ Calomel  $\text{Hg}_2\text{Cl}_2$

\* ⑬ Lunar caustic  $\text{AgNO}_3$

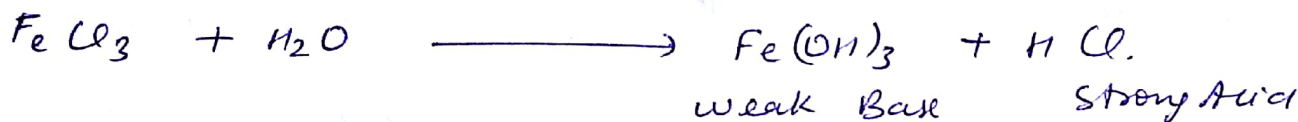
$\text{AgNO}_3$  is used in hair dyes.

It is kept in colored bottle because it gets decomposed in presence of sunlight.

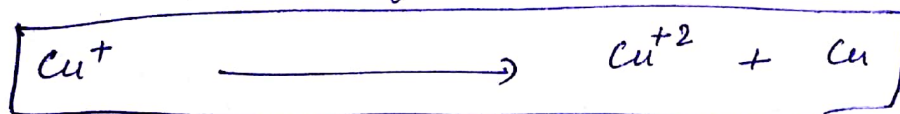
⑭  $\text{FeCl}_3$  exist as dimer in form of  $\text{Fe}_2\text{Cl}_6$



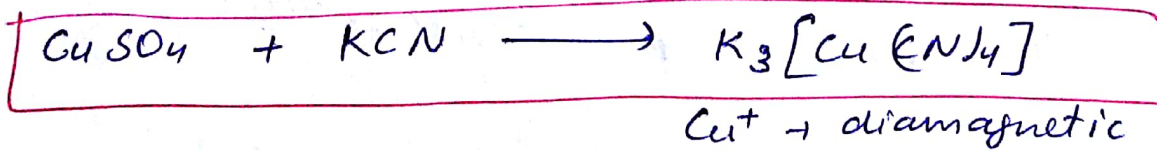
aq. solution of  $\text{FeCl}_3$  is acidic due to its hydrolysis



⑮  $\text{Cu}^+$  salts undergo disproportionation in aqueous medium.



$\Rightarrow$   $\text{Cu}^{2+}$  ions are more stable as compare to  $\text{Cu}^+$  ion in aq medium because  $\text{Cu}^{2+}$  ions undergo more hydration due to their small size and high charge density.



⑯ Br<sub>2</sub>