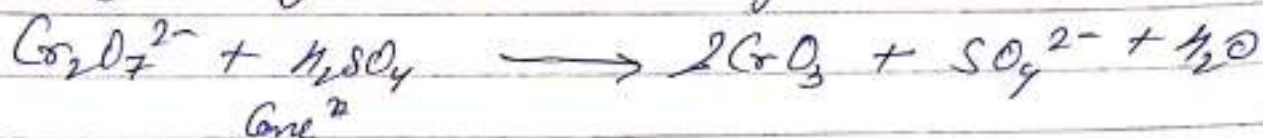


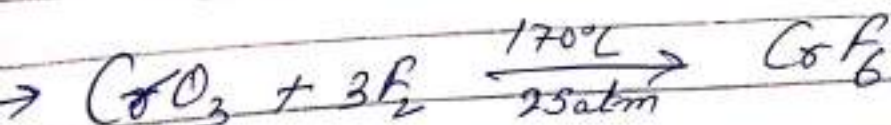
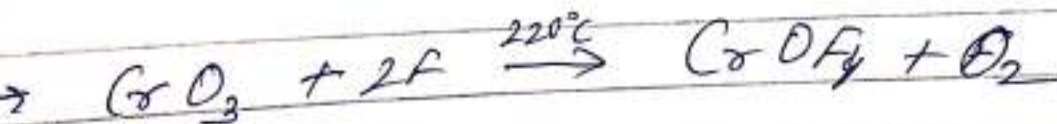
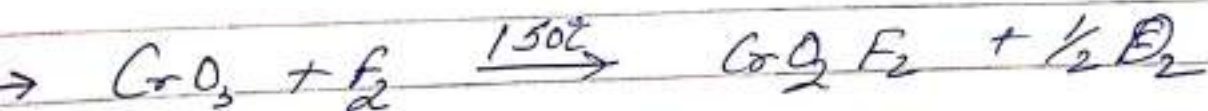
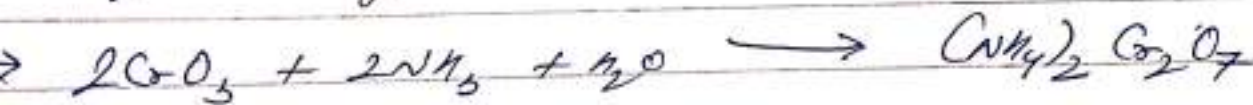
CHEMISTRY OF 3d-METALS

CHROMIUM (VI) OXIDE OR CHROMIC ACID CrO_3

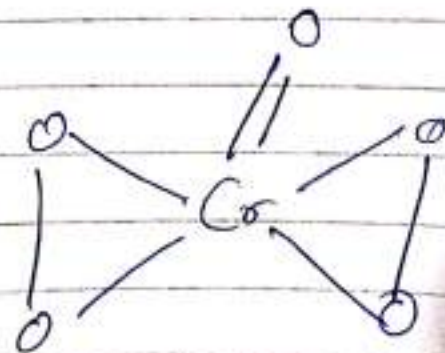
→ It is prepared by adding concⁿ H_2SO_4 to saturated aqueous solution of a dichromate (VI) salt, deep red crystals of CrO_3 separate from the solution



→ It is a strong oxidizing agent which uses in organic synthesis



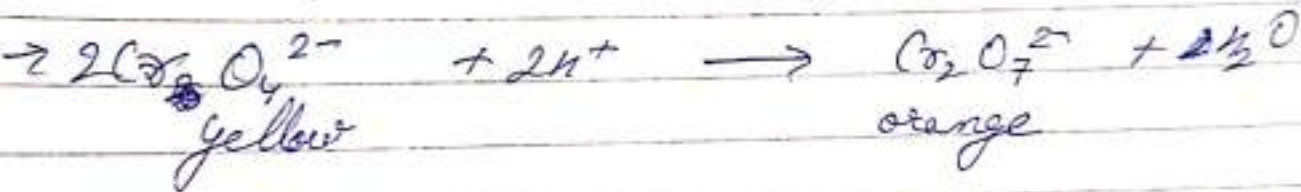
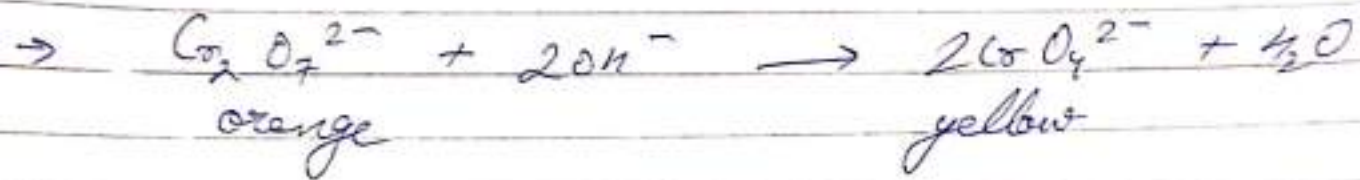
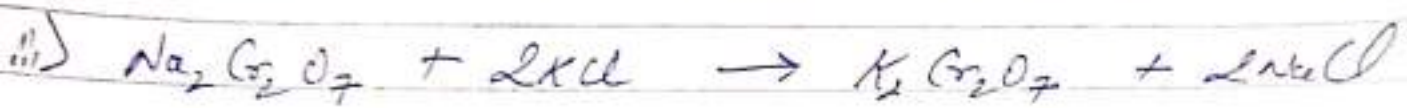
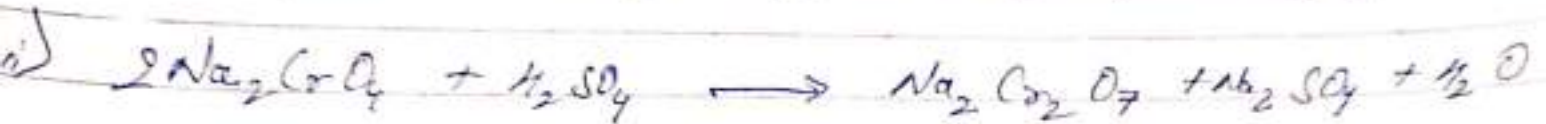
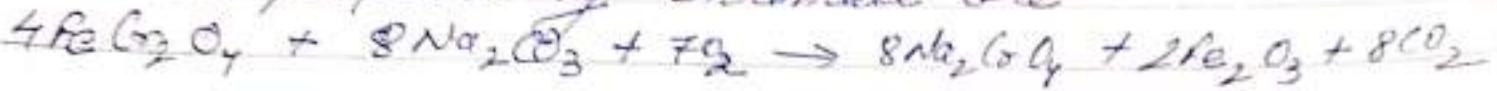
→ The deep red colour of CrO_3 is due to charge transfer from O^{2-} to Cr^{6+} LMCT not d-d transition as $Cr(VI)$ has a d^0 configuration



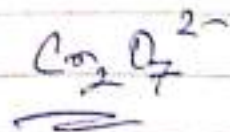
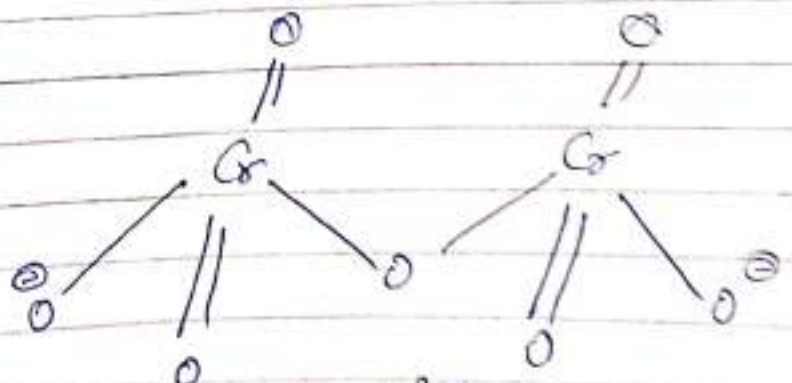
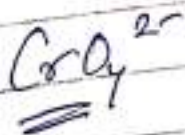
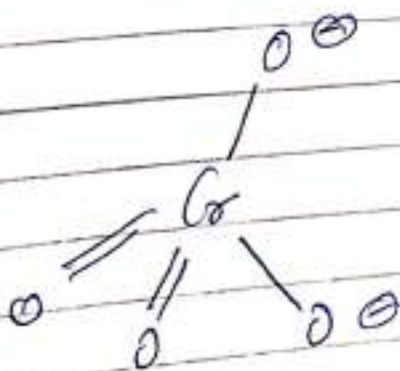
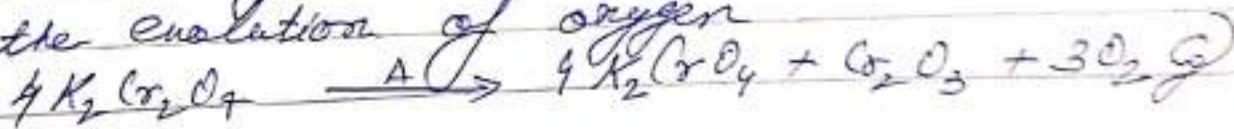
POTASSIUM DICHROMATE, $K_2Cr_2O_7$

PREPARATION

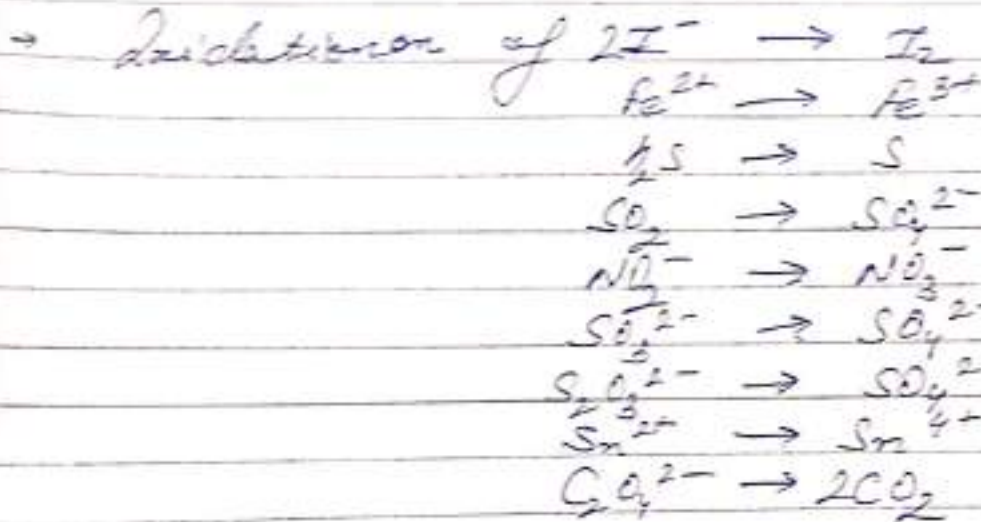
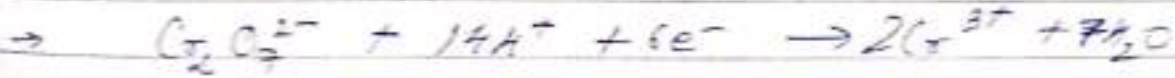
It is prepared by chromate ore



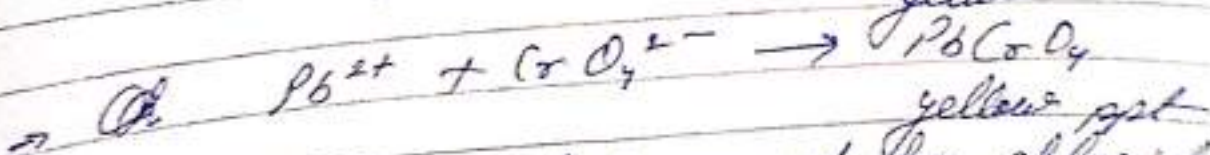
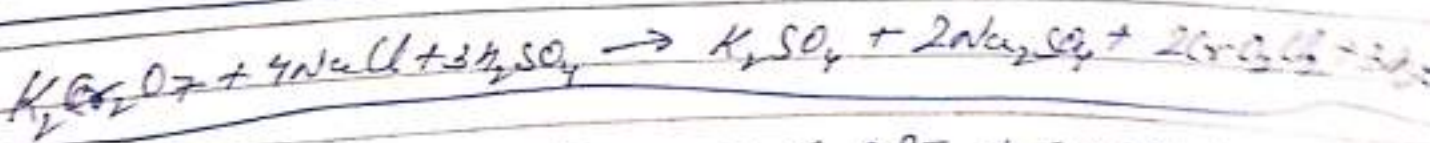
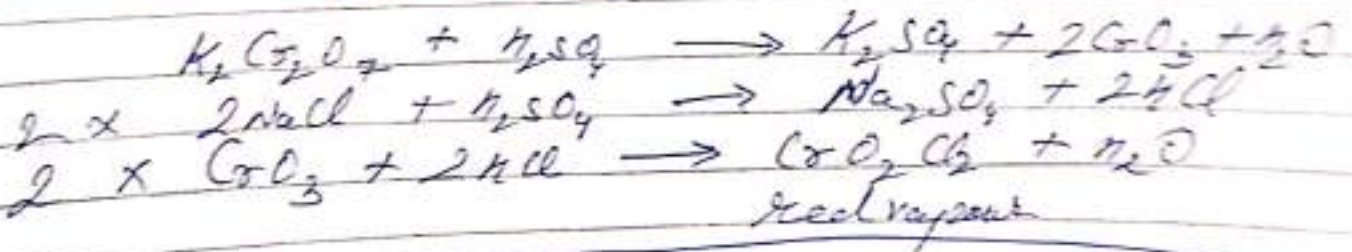
→ In strong heating, it decomposes to K_2CrO_4 with the evolution of oxygen



Oxidizing Properties

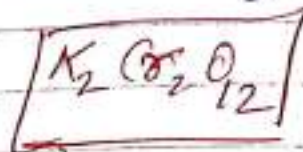
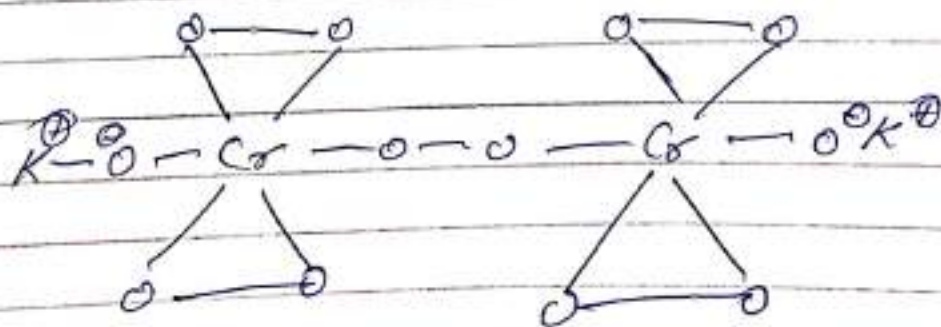
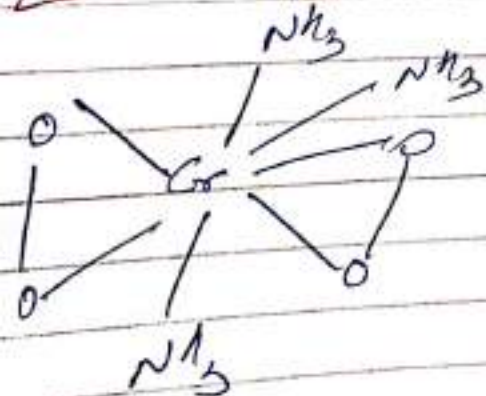
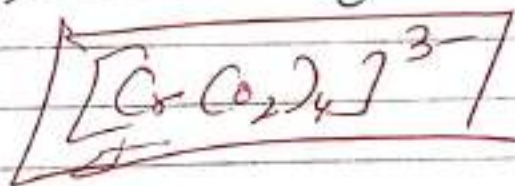
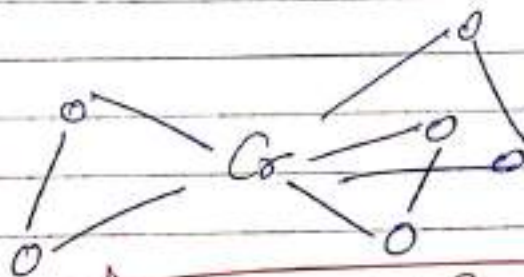
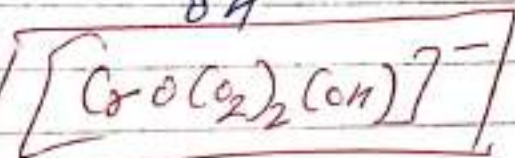
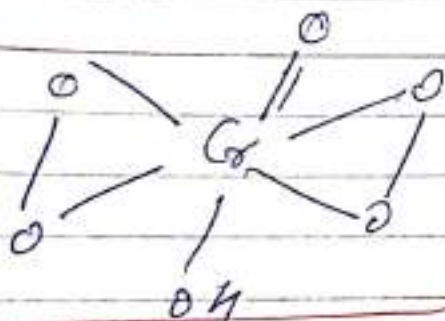
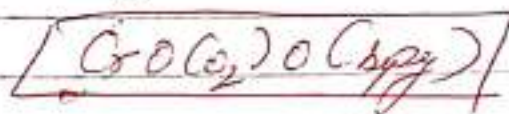
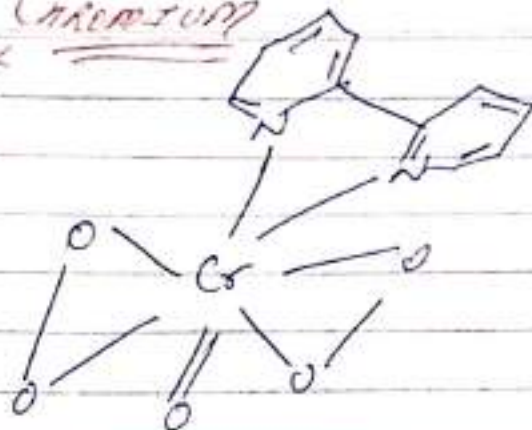
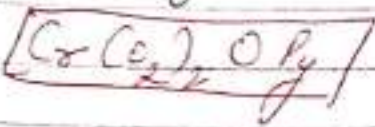
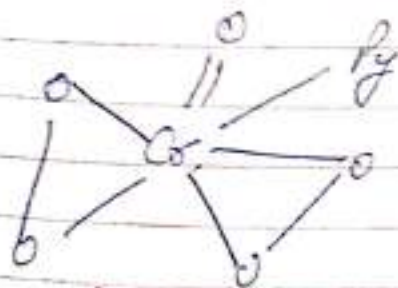


Chemical Characteristic Test



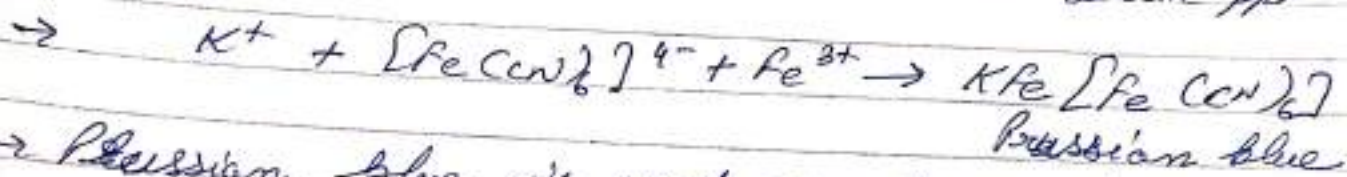
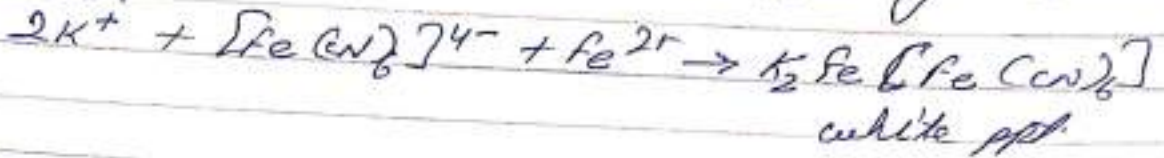
→ Chromyl chloride test is used for chloride ions

Peroxo Complex Of Chromium



POTASSIUM HEXACYANO FERRATE (III)

- $[\text{Fe}(\text{CN})_6]^{4-}$ is a low spin, diamagnetic & a yellow coloured complex
- Yellow colour is due to metal to ligand charge transfer (MLCT) transition
- It is used for qualitative analysis of iron in solution.
- When $\text{K}_4[\text{Fe}(\text{CN})_6]$ is added to the aqueous solutions of Fe^{2+} ions, white ppt of $\text{K}_2\text{Fe}[\text{Fe}(\text{CN})_6]$ is obtained



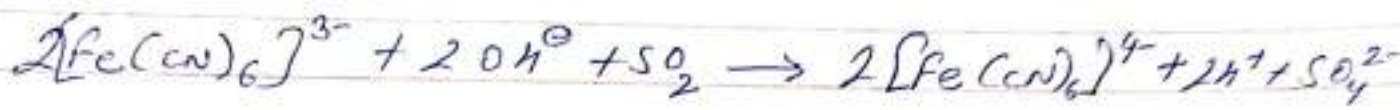
- Prussian blue is used as pigment in the manufacture of inks & paints.

POTASSIUM FERRICYANIDE ($\text{K}_3[\text{Fe}(\text{CN})_6]$)

- It is prepared by oxidation of $\text{K}_4[\text{Fe}(\text{CN})_6]$
- $3[\text{Fe}(\text{CN})_6]^{4-} + 4\text{H}^+ + \text{NO}_3^- \rightarrow 3[\text{Fe}(\text{CN})_6]^{3-} + 2\text{H}_2\text{O} + \text{NO}$
- $2[\text{Fe}(\text{CN})_6]^{4-} + 2\text{H}_2\text{O} \rightarrow 2[\text{Fe}(\text{CN})_6]^{3-} + 2\text{OH}^- + \text{H}_2$
- It is red crystalline solid. It is readily soluble.

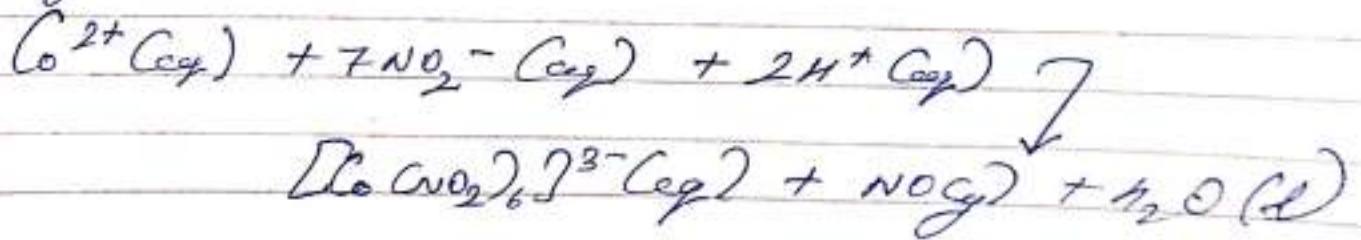
in water giving yellow colour solution. It ionizes in solution to give K^+ & $[Fe(CN)_6]^{3-}$

→ It oxidizes a number of substances in alkaline as well as in acidic medium & itself reduces to $[Fe(CN)_6]^{4-}$



SODIUM COBALT NITRITE $\{Na_3[Co(NO_2)_6]\}$

→ When $Co(NO_2)_2$ is treated with $NaNO_2$ in presence of acetic acid, sodium cobalt nitrite is formed



Sodium cobalt nitrite is soluble in water.

It is used in the quantitative analysis of K^+ & NH_4^+ ions.