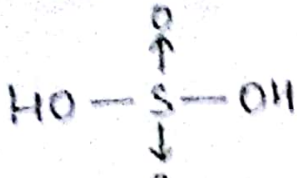


Sulphuric Acid (H₂SO₄)

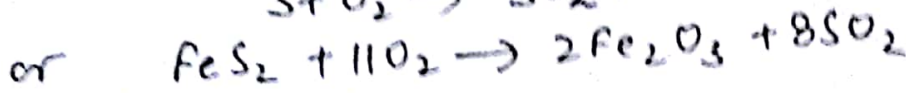


(Green vitrol)



Manufacturing of Sulphuric Acid (Contact Process)

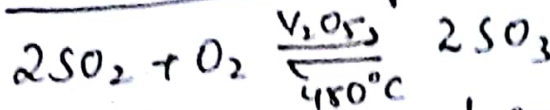
1. Production of Sulphur Dioxide.



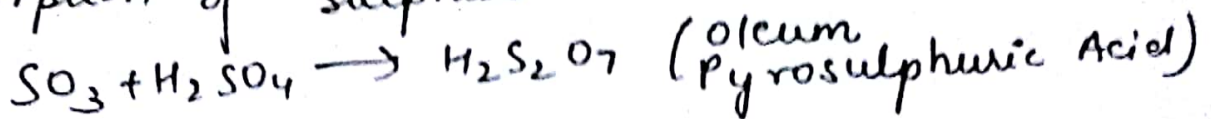
(Iron pyrites)

2. The mixture of SO₂ and air contains various impurities. The mixture passes through a purifier, scrubber and then assenic purifier.

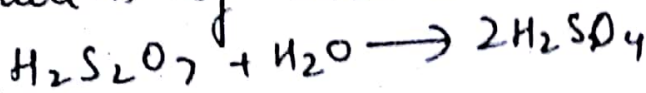
3. Catalytic oxidation of SO₂



4. Absorption of Sulphur trioxide (SO₃) in H₂SO₄



5. Dilution of Oleum



Favourable conditions for SO₂ → SO₃.

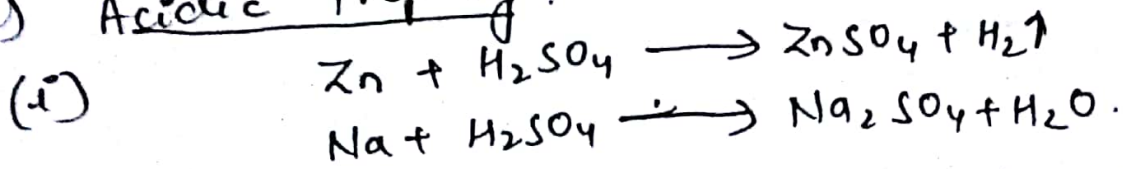
- Exothermic reactions are favoured at low temp (410-450°C)
- High pressure of 1-2 atmosphere is used because high pressure favours the reaction.
- Excess of oxygen increases the production of sulphur trioxide.
- A suitable catalyst Vanadium pentoxide V₂O₅ is used as a catalyst.

Physical Properties.

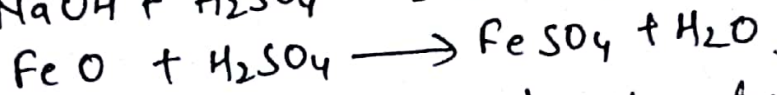
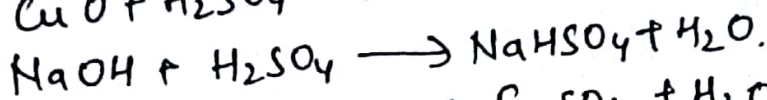
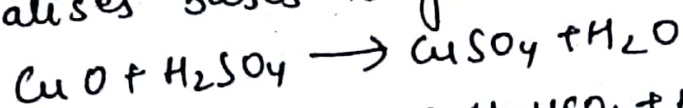
- (1) Colourless, odourless and sour in taste.
- (2) Dense, oily liquid.
- (3) Pure H_2SO_4 freezes to colourless crystals at $10.4^\circ C$.
- (4) Pure acid is almost a non-conductor of electricity.
- (5) Dil acid is a good conductor of electricity.
- (6) Conc acid is highly corrosive in nature.

Chemical Properties.

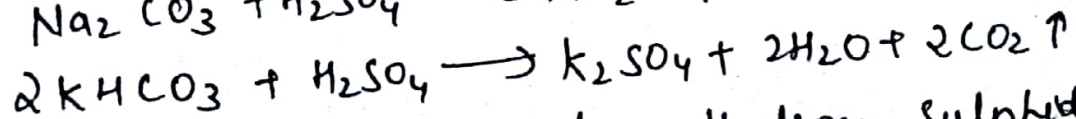
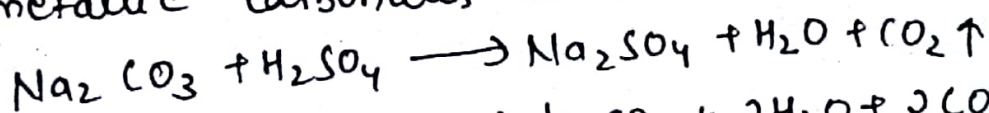
(a) Acidic Property.



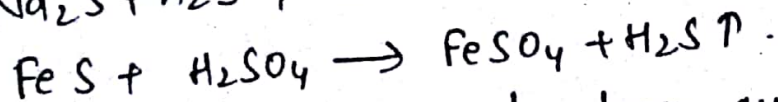
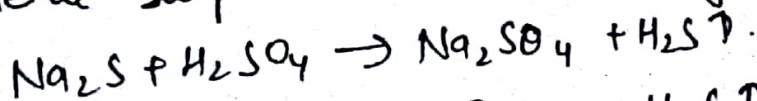
(ii) It neutralises bases to form salt and water.



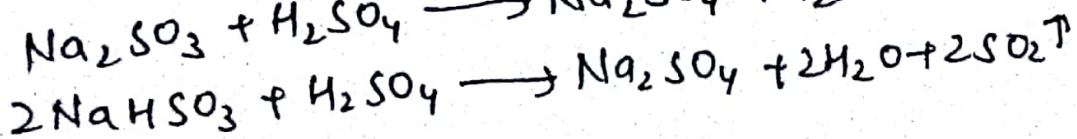
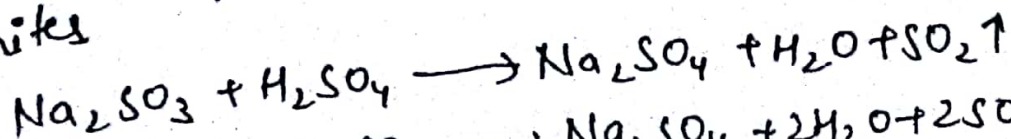
(iii) With metallic carbonates or bicarbonates liberates CO_2



(iv) with metal sulphides it evolves Hydrogen sulphide gas.

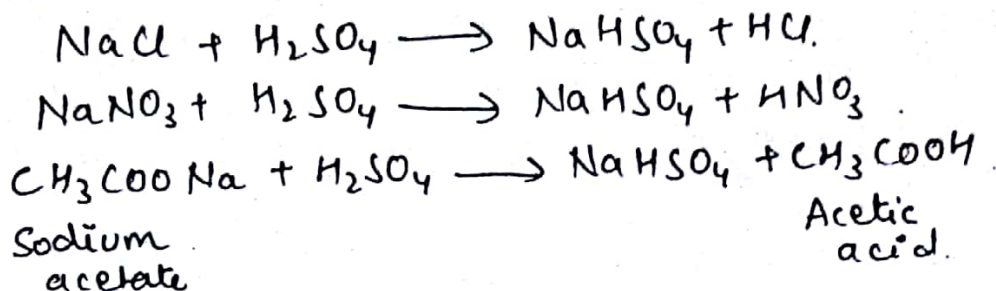


(v) It evolves Sulphur dioxide to form sulphites and bisulphites



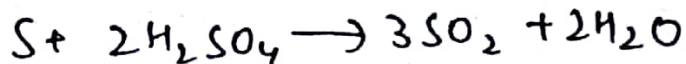
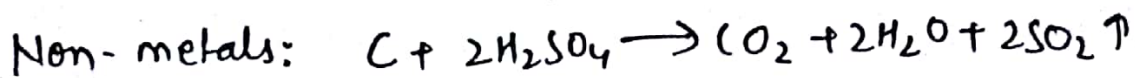
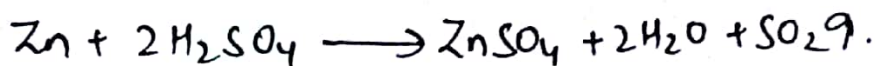
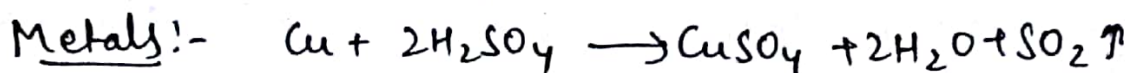
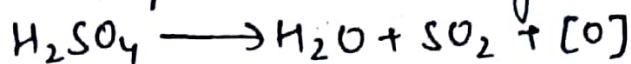
Properties of Conc. Sulphuric Acid.

(i) Non-volatile nature: Conc. H_2SO_4 is a non-volatile solid as it has a high boiling pt $338^\circ C$. It is used for preparing volatile acids like HCl , HNO_3 and CH_3COOH .



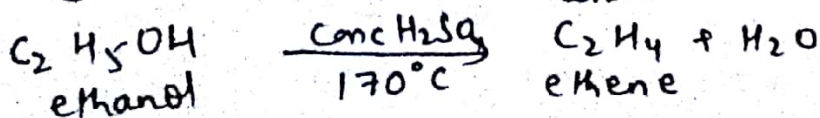
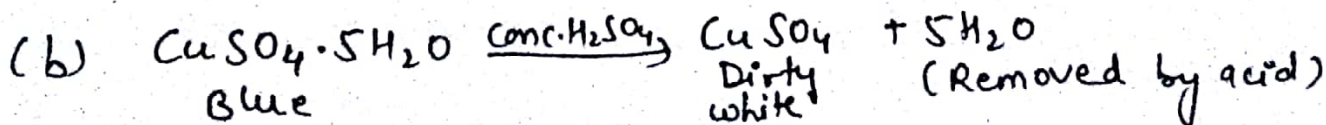
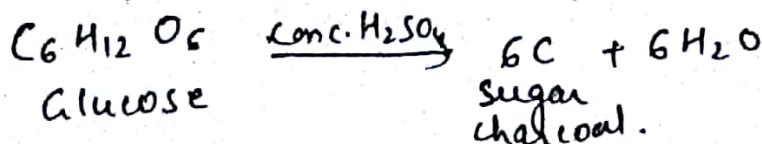
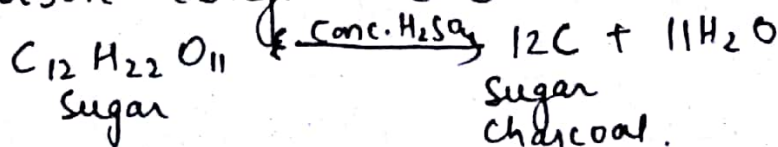
(ii) As an Oxidising Agent

Oxidising property of conc. H_2SO_4 is due to that on thermal decomposition, it gives nascent oxygen.



(iii) As Dehydrating Agent: H_2SO_4 has a great affinity for water.

(a) Carbohydrates such as glucose, sugar and cellulose react with conc. H_2SO_4 to give a black spongy mass of carbon (sugar charcoal).



Questions.

Q1. Choose the property (A, B, C or D), depending on which is relevant to each of the preparations (i) to (iii)

(A) Dil acid (typical acid properties)

(B) Non-volatile acid.

(C) Oxidising Agent.

(D) Dehydrating agent.

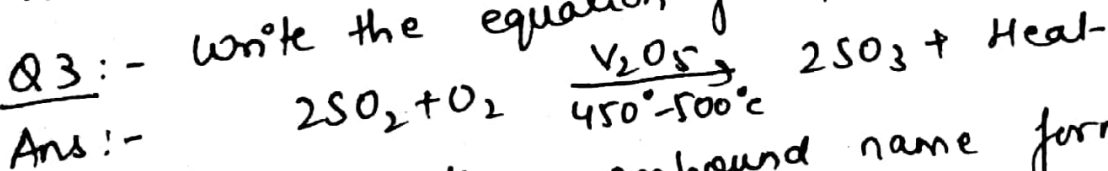
(i) Preparation of hydrogen chloride
(ii) Preparation of ethene from ethanol.
(iii) Preparation of copper sulphate from copper oxide.

Ans: (i) → B: Non-volatile acid
(ii) → D: Dehydrating agent.
(iii) → A: Dilute acid.

Q2. Name one catalyst used industrially which speeds-up the conversion of sulphur dioxide to vanadium pentoxide and sulphur trioxide.

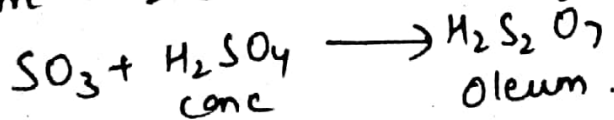
Ans:- Vanadium Pentoxide

Q3:- Write the equation for the conversion of SO_2 to SO_3 .



Q4:- What is the compound name formed between sulphur trioxide and sulphuric acid?

Ans:- Oleum ($\text{H}_2\text{S}_2\text{O}_7$) or fuming sulphuric acid.



Q5. Why V_2O_5 is used as a catalyst in conversion of SO_2 to SO_3 ?

Ans:- It is cheaper than Platinum. Pt can also be used as a catalyst, but due to impurities, it becomes poisonous.