



CALCUTTA AIRPORT ENGLISH HIGH SCHOOL (H.S.)

EXAM YEAR - 201

NAME Class - X 01/10/20

SUBJECT DATE.....

CLASS..... SECTION..... ROLL No.....

INVIGILATORS SIGNATURE	EXAMINERS SIGNATURE	MARKS OBTAINED

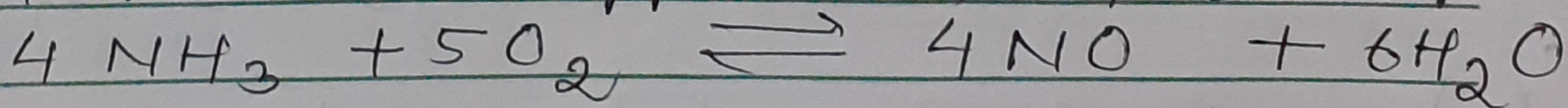
Industrial manufacture of HCl, HNO₃ and H₂SO₄.

HNO₃ → Nitric acid.

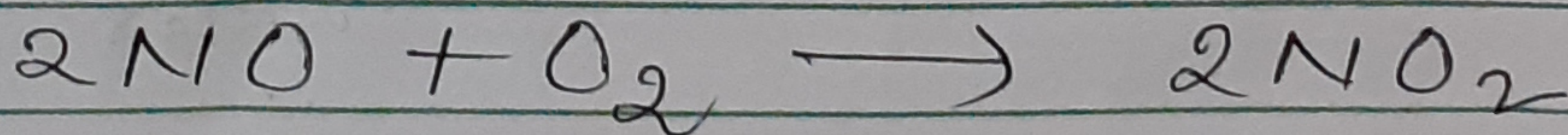
Manufacture of nitric acid by Ostwald's process

Principle :

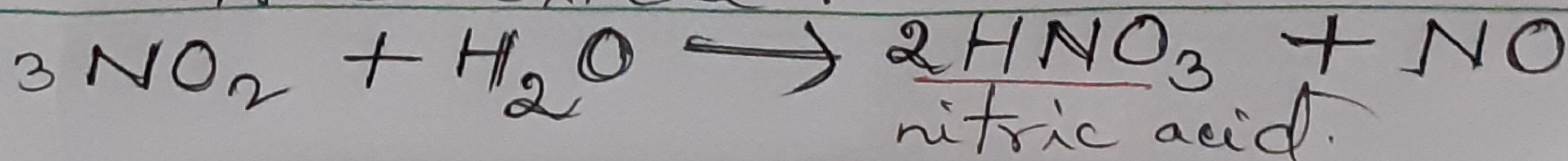
(i) Ammonia & excess air mixture is passed over platinum gauze with 10% rhodium heated at 750°C, where ammonia is oxidised by oxygen of air to produce nitric oxide. Pressure applied is 7-8 atm. pressure.



(ii) Nitric oxide further oxidised to nitrogen dioxide



(iii) Nitrogen dioxide thus produced is treated with hot water to produce nitric acid & nitric oxide.

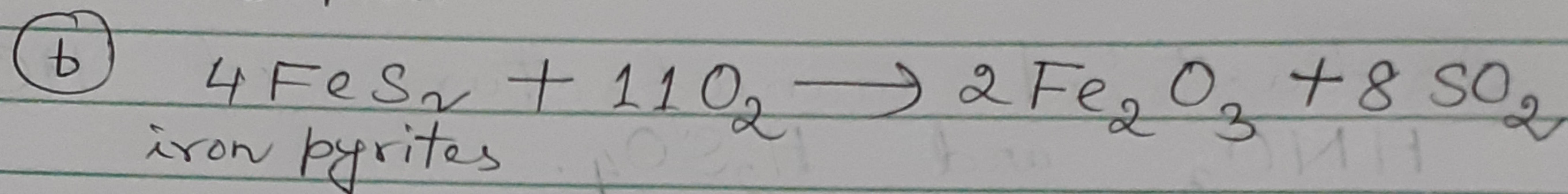
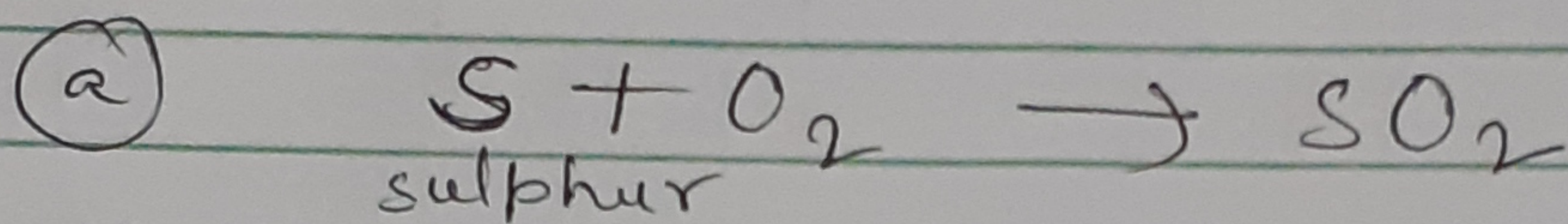


Sulphuric acid (H_2SO_4)

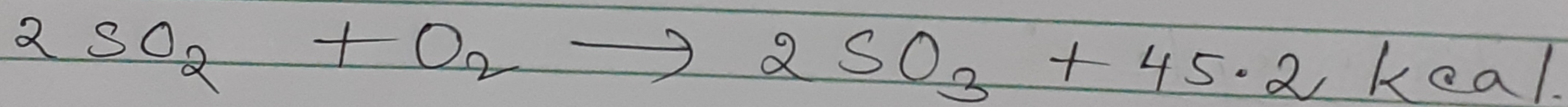
Manufacture of H_2SO_4 acid by Contact process

Principle

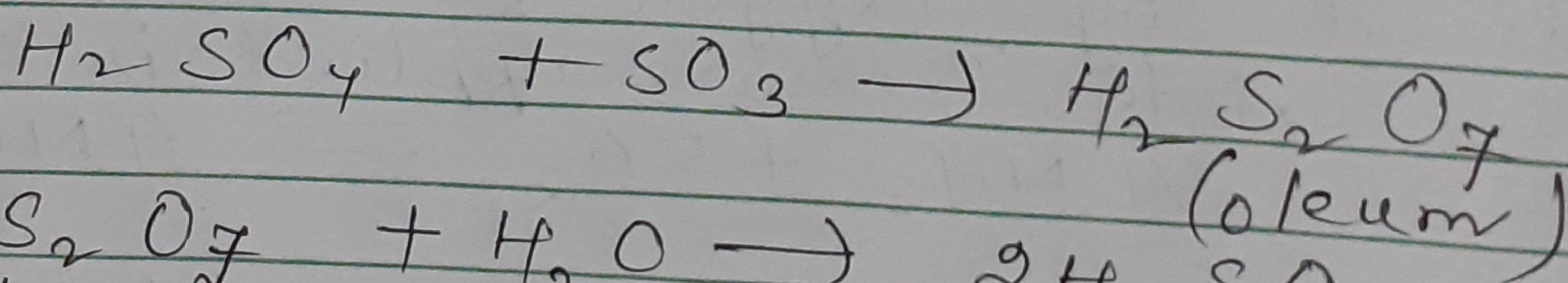
(i) Sulphur or iron pyrites is burnt in the presence of air to produce SO_2 .



(ii) SO_2 is oxidised by atmospheric oxygen at $450^\circ C$ & 1.5 atm. pressure in the presence of the catalyst platinised asbestos (Pt) or vanadium pentoxide (V_2O_5) to produce SO_3 .



(iii) The produced SO_3 is absorbed by 98% H_2SO_4 to form pyrosulphuric acid or oleum.



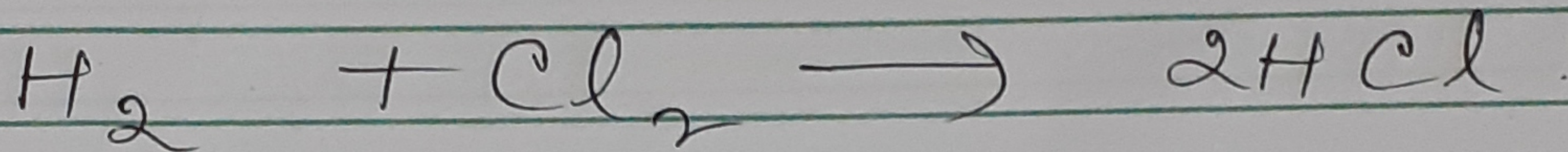
(iv) $H_2S_2O_7$ (oleum) + H_2O (pure distilled water) \rightarrow $2H_2SO_4$ (sulphuric acid).

Hydrochloric acid (HCl)

Muriatic acid.

Manufacture of HCl by synthetic method :

By direct combination of H_2 & Cl_2 gas.



Cl_2 is burnt with H_2 gas in a combustion chamber of silica bricks. The HCl gas produced is passed through the cooling pipes, cooled by the spraying of water. The gas is highly soluble in water. The cooled HCl gas is then led up an absorption tower down, where water is allowed to flow in the form of spray. So the spray of H_2O absorbs the gas quickly & the solution becomes saturated with the HCl gas. The saturated solution of hydrochloric acid is collected from the bottom of the apparatus.

HCl gas \rightarrow covalent bond.

HCl acid \rightarrow Ionic bond.

H. W

① Write the physicochemical conditions of the process to have a satisfactory yield :

(i) Ostwald's process

(ii) Contact process