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Sem:- 4

Sub:- CPT Assignment:- 1

Group:- 3

(i) How chemical industries contribute to the economy of india?

→ The chemical industries has a significant direct impact on the economy through its contribution to gross domestic product (GDP) employment and national competitiveness.

→ The chemical industry is a very important constituent of the growing indian economy and it is the mainstay of industrial and agricultural development of the country providing essential building blocks and raw materials for number of industries including textiles, paper and pulp, paint and dyes-intermediate, soap and detergent, agrochemical etc.

→ indian chemical industries (including fertilizers and pharmaceuticals) size stands \$163 Billion in 2017-18. its rank is 6th position in world and 4th in asia.

→ The chemical industry of India is a major industry in the Indian economy and as of 2022 contribute 7% of the country's gross domestic product (GDP).

(2) classify the chemical industries.

→ (i) inorganic industry:-

Products :- Titanium oxide, soda ash, HCL, sulfuric acid, caustic soda, chlorine, carbon black etc.

(ii) organic industry:-

Products :- acetone, phenol, aniline, chloromethanes, Acetic acid, methane etc.

(iii) Petrochemicals industry:-

Petrochemical products include plastics, rubbers, resins, synthetic fibers, adhesives, dyes, Petroleum derived paints and coatings etc.

(iv) Fertilizer chemical industry:-

Products :- urea, diammonium-phosphate (DAP), SSP, single super phosphate (AN), ammonium nitrate (CAN), calcium ammonium nitrate etc.

(v) Agrochemical industry:-
Products:- insecticides, herbicides,
fungicides, nematocides, etc...

(3) List out requisites for the selection of raw materials for the Paper industries.

→ The requisites of any cellulose raw material for the paper industry are:-

- (i) ample supply.
- (ii) available to the pulp mill through out the entire year.
- (iii) should not damage in storage.
- (iv) high yield of quality fibre.
- (v) capable of being collected and stored in a small area and transported in a low cost.
- (vi) quality of paper is competitive.

→ Paper production requires a distinction of a bulky fibrous material to individual or small agglomerate fibres.

→ The ideal fibre for high grade paper should be long, high in cellulose content and low in lignin contents.

(5) write down sulphur sources from which the SO_2 can be obtained.

→ SO_2 can be obtained from the following sources

(i) Sulphur sources

(ii) Pyrites

(iii) waste H_2SO_4

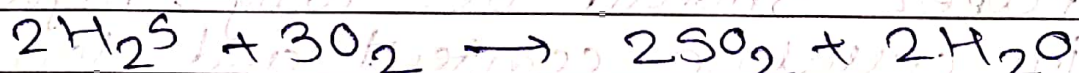
(iv) H_2S sources

(v) CaS , ZnS , PbS , MOS_2 (Smelter sources)

→ Sulphur sources:- Combustion of sulphur yields very pure SO_2 which requires only filtration and drying.

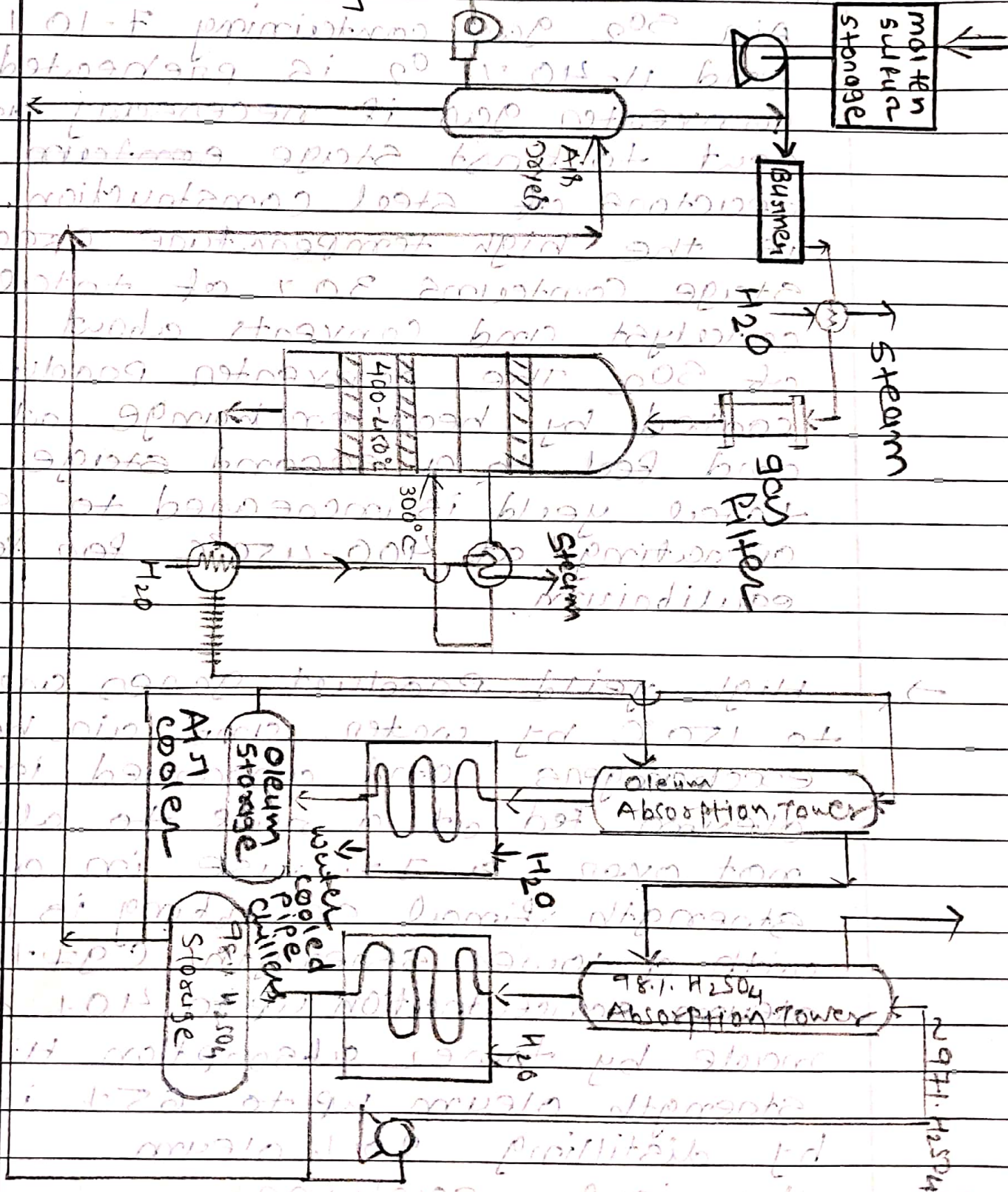
→ waste H_2SO_4 :- FeSO_4 from iron and steel pickle liquor and H_2SO_4 from petroleum refinery operation are roasted to recover SO_2 .

→ H_2S sources:- H_2S is recovered by scrubbing various fuel and refinery gas with ethanalamine followed by hot stripping.



(4)

H_2SO_4 by DCD.



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Process description:-

Air SO_2 gas containing 7-10% SO_2 and 11-40% O_2 is preheated by converter gas if necessary and sent to first stage ~~containing~~ reactions of steel construction. This is the high temperature (500-600°C) stage contains 30% of total catalyst and converts about 80% of SO_2 . The converter product is cooled by heat exchange at 300°C and fed to a second stage where total yield is increased to 97% by operating at 400-450°C for favourable equilibrium.

→

High yield product gases are cooled to 150°C by water and air heat exchangers and absorbed in oleum fed at a rate to allow not over a 1% rise in acid strength. Final scrubbing is done with a lower strength (97%) acid. Oleum concentration up to 40% can be made by tower absorption. Higher strength oleum up to 65% is prepared by distilling 20% oleum.

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Chemical reactions:-

(Cryden book)

