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PC-704: Petrochemical Engg.-II

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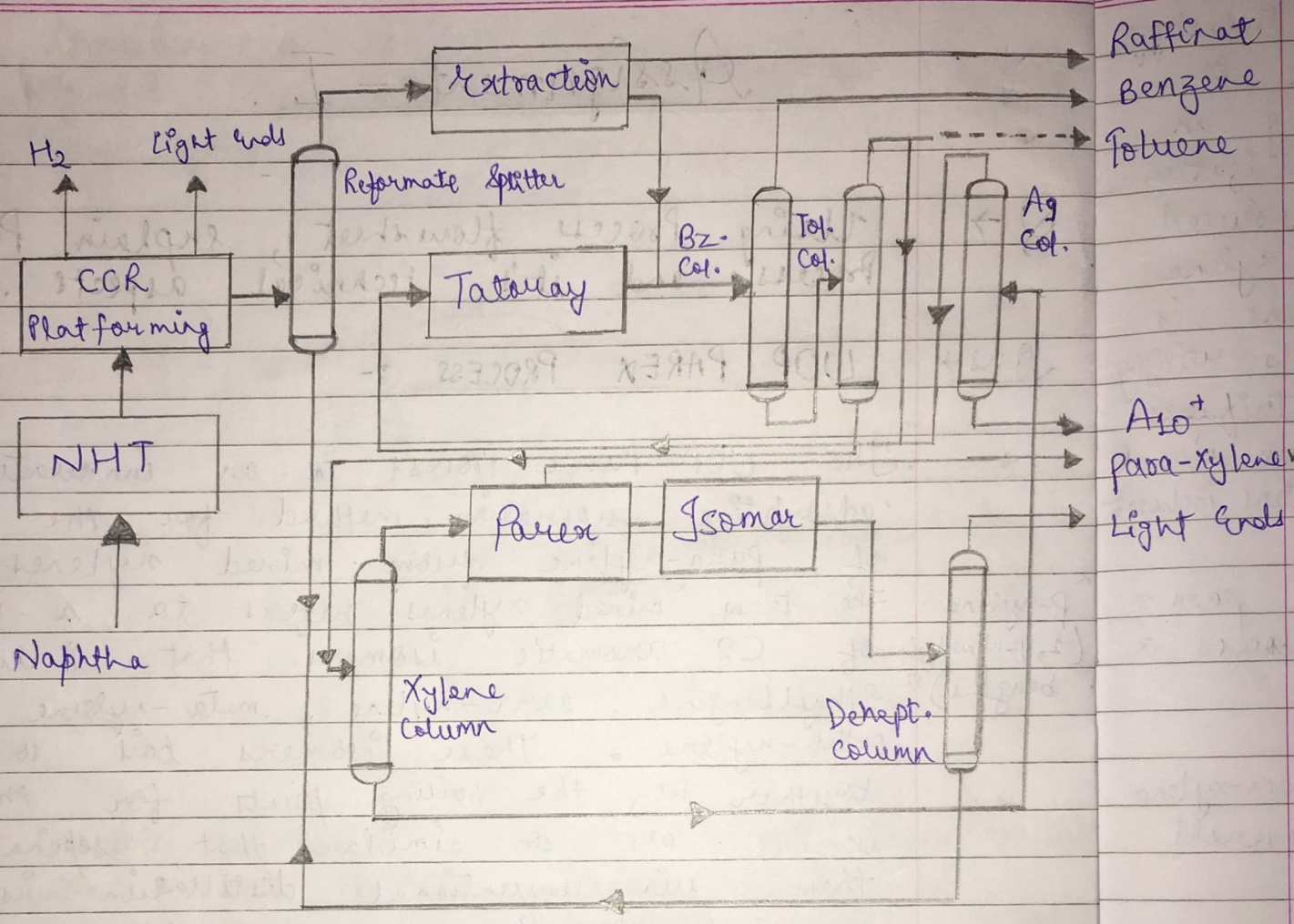
Assignment - I.

Q → Using Process flowsheet, explain Parex Process and it's technical aspects.

Ans → ## UOP PAREX PROCESS :-

The UOP Parex Process is an innovative adsorptive separation method for the recovery of para-xylene from mixed xylenes. The term 'mixed xylenes' refers to a mixture of C8 aromatic isomers that includes ethylbenzene, para-xylene, meta-xylene, and ortho-xylene. These isomers boil so closely together i.e., the boiling points for these isomers are so similar that, separating them via conventional distillation is not practical. The Parex process provides an efficient means of recovering para-xylene (1,4-dimethyl benzene) by using a solid zeolitic adsorbent that is selective for para-xylene. Unlike conventional chromatography, the Parex process simulates the countercurrent flow of a liquid feed over a solid bed of adsorbent. Feed and products enter & leave the adsorbent bed continuously at nearly constant compositions. This technique is sometimes referred to as 'simulated moving-bed (SMB)' separation.

"p-xylene (1,4-dimethyl-benzene)"



(Integrated UOP Aromatics Complex).

In a modern aromatics complex, the Parex unit is located downstream of the xylene column and is integrated with a UOP Isomar unit. The feed to the xylene column consists of the C8 aromatics products from the CCR Platforming unit together with the xylenes produced in the Tatoray unit. The C8 fraction from the overhead of the xylene column is fed to the Parex unit,

where high purity para-xylene is recoverd in the extract. The Parex raffinate is then sent to the Isomar unit, where the other C8 aromatic isomers are converted to additional para-xylene and recycled to the xylene column.

UOP Parex units are designed to recover more than 97 wt% of the para-xylene from the feed in a single pass at a product purity of 99.9 wt% or better. The Parex design is energy-efficient, mechanically simple, and highly reliable. On-stream factors for Parex units typically exceed 95 percent.

The primary end-use of p-xylene is for the production of fibres, films, or resins, including polyester fibres that are used for household fabrics, carpets, and clothing.

There are many advantages of the SBM technology, compared to the classical preparative chromatography, namely, overcoming problems associated with solid handling, efficient utilization of adsorbent/catalyst, continuous mode of operation, a reduction in solvent consumption (with upto 90% savings, compared to classical preparative chromatography), a reduction in downtime (because seperation & regeneration occur concurrently), etc.

The CoyetPX is GTC's crystallization technology for production of para-xylene, design to produce high-purity para-xylene using an innovative continuous para-xylene crystallization scheme. Para-xylene crystals are produced by suspension crystallization of the xylene isomer mixture & high-purity p-xylene is recovered by washing the PX crystals utilizing final product with pusher-type centrifuges.

This state-of-the-art technology have several benefits, some of the technical parameters include:-

→ Efficient utilization of high-concentration para-xylene feed with the flexibity to process a wide range of feed quality.

→ Minimal recycling of low-concentration para-xylene filtrate streams, leading to lower overall centrifuge loading.

→ High para-xylene product recovery and purity.

→ Broad flexibility to reconfigure system for future incremental capacity requirements due to common sizes for the major equipment, and the balanced configuration.

→ Fewer equipments result in the lowest investment cost compared with other p-xylene crystallization methods & technologies, lower maintenance & production cost, and simplicity.