

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

UNIT PROCESSES

SEMESTER – III

TEACHING SCHEME

L=3; P/D=0; TA=0

EXAMINATION SCHEME

Theory = 3hours; Marks= 100

1. Introduction:

Definition and importance of unit process in Chemical Eng., Outlines of unit processes and unit operations, Chemical process kinetics and factors affecting it, Symbols used in Chemical Eng., Process flow diagram.

2. Nitration:

Definition and scope of nitration reactions, Nitrating agents, Aromatic nitration(Schmidt and Biazzi nitrators) Mixed acid for nitration, D.V.S and nitric ratio, Comparison of batch Vs continuous nitration, Mfg. of Nitrobenzene, Dinitrobenzene, o- and p-Chlorobenzene.

3. Amination by Reduction:

Definition and scope of Amination reactions, Various methods of amination and factors affecting it, Batch and continuous methods for manufacture of Aniline from Nitrobenzene, Cont. mfg. of Nitrobenzene using catalytic fluidized bed reactor, M OC in such processes.

4. Halogenation:

Definition and scope of various halogenation reactions, Halogenating agents, Industrial halogenation with types of equipments and its material MOC., Mfg. of Chlorobenzene, BHC and Vinyl chloride from Ethylene and Acetylene.

5. Sulfation and Sulfonation:

Definition and scope of such reactions, Sulfonating and sulfating agents and their applications, Chemical and physical factors affecting it, Industrial equipments and techniques for batch Vs cont. sulfonation, Mfg of benzenesulfonic acid and Dodecyl Benzene Sulfonates, Sulfation of Dimethyl Ether and Lauryl alcohol.

6. Amination by Ammonolysis:

Definition and types of reactions, Aminating agents, Physical and chemical factors affecting it, Catalyst used in ammonolysis, Mfg. of Aniline from Chlorobenzene and Nitroaniline from Dichloronitroaniline.

7. Oxidation:

Definition of oxidation, Oxidizing agents, Liquid phase oxidation, Oxidation of Toluene with MnO₂, Mfg. of Acetic acid from Acetaldehyde, Mfg. of Acetic acid from Ethanol, Vapour phase oxidation of Methanol, Benzene and Naphthalene, Apparatus and its MOC for oxidation reactions.

8. Hydrogenation:

Definition and its scope, Properties of hydrogen and sources of hydrogen gas, Catalytic hydrogenation and hydrogenolysis, Factors affecting it, Apparatus and MOC, Industrial hydrogenation of fats and oil, Mfg. of Methanol from CO and H₂.

9. Hydrolysis:

Definition and types of hydrolysis, Hydrolysing agents, Equipments of hydrolysis, Industrial hydrolysis of fat, Hydrolysis of Carbohydrates, Starch to Dextrose, Mfg of Ethanol from Ethylene(Shell process), Mfg. of Phenol from Benzenesulfonic acid.

10. Polymerization:

Introduction and chemistry of polymerization reactions, Classification of polymers, Methods of polymerization

REFERENCES:

1. Groggins P.H., "Unit Processing of Organic Synthesis", McGraw Hill.
2. Dryden's, "Outlines of Chemical Technology"
3. Shreve and Brink, "Chemical Process Industries", McGraw Hill.