

Bachelor of Science (B.Sc.) Semester—III (C.B.S.) Examination

INDUSTRIAL CHEMISTRY (ICH—302)

Paper—II

Time : Three Hours]

[Maximum Marks : 50

N.B. :— (1) All questions are compulsory and carry equal marks.

(2) Draw diagrams and write equations wherever necessary.

1. (A) How is m-dinitrobenzene manufactured from nitrobenzene by continuous nitration process ?
Explain with well labelled diagram. 5

(B) How will you convert the following :

(i) Chlorobenzene to ortho and para nitrobenzene

(ii) Acetanilide to para nitro acetanilide ? 5

OR

(C) Discuss the kinetic of Nitration of Toluene. 2½

(D) How will you distinguish Continuous and Batch nitration ? 2½

(E) Explain the process of nitration of paraffinic hydrocarbons. 2½

(F) Explain mechanism of nitration of Acetanilide. 2½

2. (A) Describe the method of commercial manufacturing of chlorobenzene and dichloromethane. 5

(B) What do you mean by halogenation reaction ? What are different types of halogenation reactions ? Explain any one with suitable example. 5

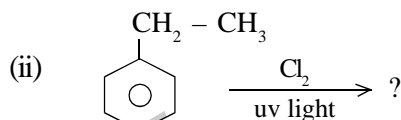
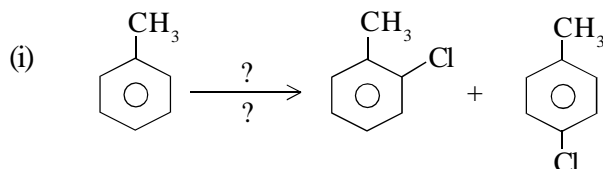
OR

(C) How will you synthesized chloral industrially ? 2½

(D) Explain the kinetics of halogenation with suitable reaction. 2½

(E) Explain the nuclear halogenation of aromatic compound. 2½

(F) Complete the following reactions :



2½

3. (A) What is sulphonation ? Give the mechanism of sulphonation of benzene. 5
 (B) How is Benzoic acid prepared industrially ? 5

OR

- (C) Explain the mechanism of Sulphonation of Naphthalene. 2½
 (D) What is meant by oxidising agent ? What is role of oxidising agent in chemical reaction ? 2½
 (E) Distinguish between Batch vs. Continuous Sulphonation. 2½
 (F) How is Acetaldehyde Synthesized ? 2½
 4. (A) What is alkylation ? What are different types of alkylating agents ? Explain the thermodynamics of alkylation reaction. 5
 (B) Explain the process of hydrogenation of oil with the help of flow sheet diagram. 5

OR

- (C) How is Ethyl benzene synthesized commercially ? 2½
 (D) Explain role of hydrogenating agent in reaction. 2½
 (E) How will you synthesized methanol from CO and H ? 2½
 (F) Draw the flow sheet diagram of continuous process for manufacture of alkyl benzene. 2½
 5. Attempt any **ten** of the following :
 (i) How will you form the Nitronium ion in the reaction of conc. HNO_3 and conc. H_2SO_4 ?
 (ii) Write any two properties of nitro paraffins.
 (iii) Nitration is electrophilic or nucleophilic substitution reaction. Give comment.
 (iv) Give any two chlorinating agents.
 (v) Complete the following reaction :

$$\text{CH}_3 - \text{CH}_2 - \text{OH} \xrightarrow{\quad ? \quad} \text{CH}_3 - \text{CH}_2 - \text{Cl} + ?$$

 (vi) Write the structural formula of dichloro-fluoromethane.
 (vii) Define oxidation reaction.
 (viii) Which sulphonating agent is used for sulphonation of alkyl benzene ?
 (ix) Give the reaction where ozone is used as oxidising agent.
 (x) Give any two hydrogenating agents.
 (xi) How many types of alkylation ?
 (xii) What is role of catalyst in hydrogenation reactions ? 1×10=10