

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. FIFTH SEMESTER EXAMINATION, DECEMBER 2012

THIRD YEAR

INDUSTRIAL CHEMISTRY (Honours)

Date : 19/12/2012

Time : 11 am – 1 pm

Paper : V

Full Marks : 50

[Use separate Answer Book for each group]

Group - C

1. Answer **any four**: [4×5]
- What are the major air pollutants in cities and what are the major sources of these pollutants?
 - Describe with a flow sheet, air pollution control in cast iron industry.
 - What steps have been taken to minimize automobile pollution?
 - What is the name and chemical structure of the gas responsible for Bhopal disaster?
 - What are the major green house gases? What does the term green house gas mean?
 - Describe steps of industrial waste water treatment with a flow diagram.
 - Explain why the bag filter is not suitable for particles from—
 - lime slaking
 - fly ash from coal burning
 - heavy mist from chemical industry.

Group – D

Unit – I

(Answer **any four** questions)

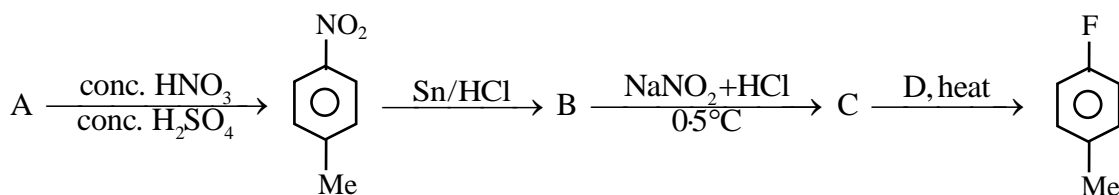
2.
 - Distinguish between dihedral angle and torsion angle with example. [1]
 - Draw the potential energy diagram of n-butane due to rotation about C₂ – C₃ bond. [2]
 - Between cis and trans 4-tertiary butyl cyclohexyl tosylates, which one would solvolyse at a faster rate and why? [2]
3.
 - Write down the products with stereochemistry, of the following reactions : [3]
 - $(R) - \text{MeCHBrCH}_2\text{CH}_3 \xrightarrow{(-)\text{OMe}}$
 - $(R) - \text{PhCHMeCl} \xrightarrow{\text{H}_2\text{O}}$
 - '1,2-dihalocyclohexane always prefers to adopt diaxial conformation rather than diequatorial conformation' — give an explanation. [2]
4.
 - Draw the Newmann projection formulas of axial and equatorial methyl cyclohexanes and indicate the gauche-butane interactions in each formula due to methyl group. [3]
 - 'Gauche is the most stable conformer of 1,2-dihydroxy ethane' —explain. [2]
5.
 - What is ring inversion of cyclohexane? What are the possible pathways of inversion? Show any one path way of such inversion. [3]
 - Show all possible conformers of cis-1, 3-diethyl cyclohexane. Indicate, which one is the most stable form and why? [2]
6.
 - Write down the product(s) with stereochemistry of the following reaction : [2]
 $(R,R) - 2,3\text{-dibromobutane} \xrightarrow[\text{KOH, } \Delta]{\text{alcoholic}} ?$
 - 'Trans-4-tertiary butyl cyclohexyl tosylate does not undergo base catalysed E2-reaction but the cis-isomer does' —Explain [2]
 - Define the term 'conformation'. [1]

7. Write down the chair conformations of each of cis and trans-1, 2-dimethyl cyclohexane and discuss their relative stability and indicate their relationships. Between cis and trans isomers, which one is more stable? [2+2+1]

Unit – II

(Answer any two questions)

8. a) Separate the components from a mixture of ethyl amine and diethyl amine, showing the reactions involved. [2]
 b) Using Gabriel phthalimide method, synthesise ethyl amine. [3]
9. a) Synthesise 2-Ethyl naphthalene from benzene by the Haworth method. (Use any other organic reagent you need.) [2]
 b) What happens when methyl amine is warmed with carbon disulfide and the resulting product is subsequently treated with mercuric chloride? What is the name of the entire reaction? [1½+1½]
 c) What happens when naphthalene is heated with a mixture of conc. HNO₃ and H₂SO₄ acid? [1]
10. a) What happens when acetaldehyde is treated with ammonium formate? What is the name of this reaction? [2]
 b) Carry out the following conversions : [3]
 i) Benzene → m-nitroaniline
 ii) Aniline → p-dinitrobenzene
11. a) Identify the compounds 'A' through 'D' in the following sequence of reactions : [2]



- b) Complete the following reactions : [3]

