Bachelor of Science (B.Sc.) Semester—II Examination

CHEMISTRY

CH–201 : (Organic Chemistry)

Compulsory Paper—I

Time—Three Hours] [Maximum Marks—50

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

(2) Give diagrams and chemical equations wherever necessary.

1. (A) What is hybridization ? Explain formation of Ethylene molecule on the basis of hybridization. 5

(B) Explain with suitable examples :

(i) Homolytic bond fission and

(ii) Heterolytic bond fission of a covalent bond. 5

OR

(C) Write a note on Hydrogen bonding with reference to alcohol. 2½

(D) Write a note on Electromeric effect. 2½

(E) Define :—

(i) Bond length and

(ii) Bond angle. 2½

(F) Identify electrophiles and nucleophiles :

(i) NH_3

(ii) $FeCl_3$

(iii) $H_3O^{\oplus}$

(iv) H_2O and

(v) $CN^{\ominus}$ 2½

2. (A) Define conformation. Discuss conformational analysis of n-Butane molecule. 5

(B) Explain the following :

(i) Enantiomer with reference to Lactic acid and

(ii) Diastereomer with reference to tartaric acid. 5

OR

(C) What is difference between configuration and conformation ? 2½

(D) Discuss the geometrical isomerism in maleic acid and fumaric acid. 2½

(E) Explain in short :—

(i) Chiral centre and

(ii) Optical activity. 2½

(F) Write a note on 'Walden Inversion'. 2½

3. (A) Write note on conformational analysis of cyclohexane. Show axial and equatorial bonds. 5

(B) What is Markovnikoff's rule ? Give ionic mechanism of addition of HBr to Propylene. 5

OR

(C) Give free radical mechanism of chlorination of methane. 2½

(D) How will you prepare ethane by following :

(i) Wurtz reaction and

(ii) Kolbe's reaction ? 2½

(E) Draw the structure of following :—

(i) 2-Methyl-2-butene and

(ii) 2, 3-Dimethyl-1-butene. 2½

(F) What happens when propylene is oxidized with alkaline solution of $KMnO_4$ in cold as well as hot condition ? 2½

4. (A) What are dienes ? Give their classification with one example of each. Give preparation of 1, 3-butadiene from :

(i) n-Butane and

(ii) Butane-1, 4-diol. 5

(B) What is aromatic electrophilic substitution reaction ? Discuss the mechanism of sulphonation of benzene with energy profile diagram. 5

OR

(C) Discuss molecular orbital picture of benzene. 2½

(D) Explain acidic nature of acetylene molecule. 2½

(E) Discuss Diels-Alder reaction. 2½

(F) Why following ions show aromatic behavior ?

(i) Cyclopentadienyl anion and

(ii) Cycloheptatrienyl cation. 2½

5. Give any **TEN** answers of following questions :—

(i) Define bond energy. 1

(ii) What is meant by Reactive intermediate ? 1

(iii) Write a reaction representing addition reaction. 1

(iv) Define molecular chirality. 1

(v) Why is Racemic mixture optically inactive ? 1

(vi) Draw Newman Projection and Sawhorse formulae of ethane. 1

(vii) What is alkyl group ? Give one example. 1

(viii) Give IUPAC name of neo-Pentane. 1

(ix) Give the reaction of Polymerisation of ethylene. 1

(x) Draw the Kekule structure of benzene. 1

(xi) How is benzene obtained from acetylene ? 1

(xii) What is oxyacetylene flame ? 1