TKN/KS/16/5797

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

CHEMISTRY

(Organic Chemistry)

Compulsory Paper—I [CH-201]

Time : Three Hours] [Maximum Marks : 50

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

(2) Give diagrams and chemical equations wherever necessary.

1. (A) Explain :

(i) Resonance effect ; and

(ii) Hydrogen bonding in alcohols. 5

(B) Discuss Homolytic and Heterolytic fission of a covalent bond by giving suitable examples. 5

OR

(C) Draw molecular orbital diagram of ethylene molecule. Why is ethylene molecule planar ? Explain. 2½

(D) Explain the terms :

(i) Bond length, and

(ii) Bond energy. 2½

(E) Discuss stability of free radicals. 2½

(F) What are carbenes ? Explain the formation of carbene with example. 2½

2. (A) Define conformers and conformational analysis. Discuss conformational analysis of n-Butane with energy diagram. 5

(B) What is geometrical isomerism ? What are necessary conditions for a molecule to exhibit geometrical isomerism ? Discuss geometrical isomerism in 2-Butene. 5

OR

(C) Write a note on asymmetric synthesis. 2½

(D) What is meant by resolution ? Describe a chemical method for resolution of a racemic mixture. 2½

(E) Write a note on E, Z system of nomenclature. 2½

(F) Distinguish between enantiomers and diastereoisomers by giving suitable example. 2½

3. (A) What are alkanes ? How are they prepared by :

(i) Wurtz reaction, and

(ii) Decarboxylation of carboxylic acids ?

Explain the following reactions of alkanes :

(i) Cyclization, and

(ii) Aromatization. 5

(B) Define cycloalkanes. How is cyclohexane prepared from :

(i) Phenol, and

(ii) 1. 4-Dibromohexane ?

How does cyclohaxane react with :

(i) Concentrated Nitric Acid, and

(ii) Concentrated Sulphuric Acid ? 5

OR

(C) Give a method of preparation of propylene from 2-bromopropane. Explain the reaction of ozone on propylene. 2½

(D) Discuss free radical mechanism of addition of HBr to propene. 2½

(E) Define and explain octane number. 2½

(F) Explain theory of strainless rings. 2½

4. (A) What are alkadienes ? How is 1, 3 butadiene obtained from 1, 4 butanediol ? Explain 1, 2 and 1, 4 additions of 1, 3 butadiene. 5

(B) What is aromatic electrophilic substitution ? Discuss mechanism of nitration of benzene with its energy profile diagram. 5

OR

(C) How is acetylene prepared from calcium carbide ? What happens when acetylene gas is passed through cuprous chloride solution in presence of ammonium chloride ? 2½

(D) What is the action of following reagents on acetylene :

(i) Acidic $KMnO_4$ solution, and

(ii) Diborane followed by the action of H_2O_2 ? 2½

(E) Discuss Kekule's structure of benzene. 2½

(F) What is Huckel's rule of aromaticity ? Explain aromaticity of cyclopentadienyl anion. 2½

5. Solve any **TEN** from the following : 1×10=10

(i) What is the value of H–C–C bond angle in ethene molecule ?

(ii) Define nucleophile. Give one example.

(iii) Write different types of stereoisomerism.

(iv) Define bond angle.

(v) What is meant by configuration ?

(vi) Define optical activity.

(vii) Write structural isomers of pentane.

(viii) Calculate angle strain of cyclopentane.

(ix) Define diene.

(x) What are the constituents of LPG ?

(xi) What is oxyacetylene flame ?

(xii) Write any two isomers of xylene.