DE-1293
M. Sc. (Sem. - I) [Reg. & Even. Course & Self Finance Reg.] Examination
March/April – 2016
Organic Chemistry : Paper - II

Time : Hours] [Total Marks :

Instructions :

(1)

(2) Figures to the right indicate full marks of questions.

1 Answer any three of the following : 18

(a) What are the halogen carbenes ? Discuss the methods for the formation of halogen carbenes. Explain the mechanism of Reimer-Tiemann's reaction.

(b) What are carbocations ? Give the illustrations of each 1°, 2° and 3° carbocations; giving the method of generation of carbocations.

(c) (i) What are free radicals ? Give different methods of generation of short-lived and long-lived free radicals.

(ii) Give end product(s) and mechanism for the following reactions :

\[
\begin{align*}
\text{CHO} + H_3C\cdotCH_2\cdot \overset{\text{Petkine}}{\text{reaction}} & \to \text{CHO} + \text{NaCN} \\
\text{H}_3\text{C}\cdot\text{CH}_2\cdot\text{S}_\text{O} & \to \text{H}_3\text{C}\cdot\text{CH}_2\cdot\text{SO} \\
& \to \text{H}_3\text{C}\cdot\text{CH}_2\cdot\text{SO} \\
2\text{CHO} + \text{NaCN} & \to \text{CONH}_2 + \text{NaCN}
\end{align*}
\]

DE-1293] 1 [Contd...
(d) On the basis of pKa values of hydrocarbons, explain the stability of carbanions. Explain the role of carbanion as an intermediate in benzoin condensation.

2 Answer any three of the following:

(a) What are cyclo addition reactions? Explain 1, 3-dipolar cyclo addition reactions.

(b) Sketch the π-molecular orbitals of 1, 3-Butadiene and allyl system and give symmetric properties.

(c) Give characteristics of pericyclic reactions. Give the types of this reaction with illustrations.

(d) Describe Fino method for cyclisation of 1, 3, 5 hexatriene and ring opening of 1, 3 cyclohexadiene. Give selection rules for this interconversion.

3 Answer any three of the following:

(a) What is prochirality? Explain the prochirality in 1, 3-propane dial and prochiral relationship between ethanol and acetaldehyde.

(b) Discuss the optical activity of biphenyls, allenes and spiranes.

(c) What is conformational analysis? Discuss the conformers of decalins.

(d) Explain dynamic stereo chemistry. Explain the stereo chemistry of compounds containing 'N' atom.

4 Answer any four of the following:

(a) Draw the axial and equatorial bonds in cyclohexane. Explain the different conformations in mono substituted cyclohexane and discuss the stability.

(b) With the help of correlation diagram show that Diels – Alder reaction is thermally allowed process.
(c) Complete the following reactions and give reaction intermediate involved in the reactions:

(i) \[ \text{Cyclic Compound} \xrightarrow{\text{CHCl}_3 / \text{CH}_3\text{ONa}} \]

(ii) \[ \text{Phenol} \xrightarrow{\text{CH}_3\text{CO}_2\text{O} / \text{CH}_3\text{COONa} / \Delta} \]

(d) Discuss the mechanism of the following rearrangements in which carbocation play a key role:
   - Pinacol – Pinacolone rearrangement
   - Dienone – Phenol rearrangement.

(e) Complete the following reactions with structural formula:

(i) \( \text{Styrene} + \text{Diazomethane} \xrightarrow{80^\circ C} ? \)

(ii) \( \text{H}_3\text{C} - \text{C} - \text{H}_3 \xrightarrow{\text{hv}} ? \)

(\(2E, 4Z\))

(iii) \( \text{Benzene} + \text{1,2-Dichloro ethene} \xrightarrow{\text{hv}} ? \)

(iv) \( \text{Ethyne} + \text{Diazomethane} \rightarrow ? \)