

2018

Time : 3 hours

Full Marks : 80

Answer from **both** the Sections as directed

The figures in the right-hand margin indicate marks

*Candidates are required to answer in their own words
as far as practicable*

(ORGANIC CHEMISTRY-II)

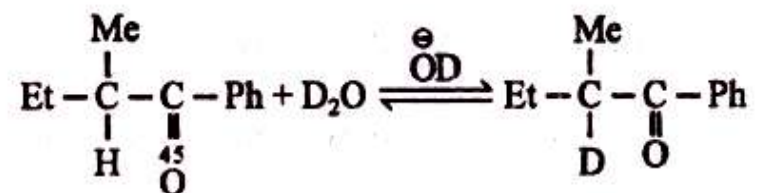
SECTION – A

1. Answer any *four* of the following : 4 × 4
- (a) What is SE_2 reaction. Explain with suitable examples.
- (b) Give evidence to show that Aromatic Electrophilic Substitution is a two step process and that the removal of proton is not the rate determining step.

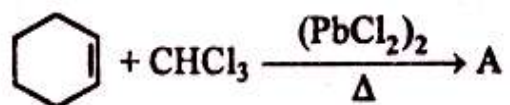
(2)

(c) Compare the reductions using LiAlH_4 and sodium borohydride.

(d) Outline the mechanism for the following reaction :



(e) Identify 'A' and outline the mechanism of the following addition reaction :



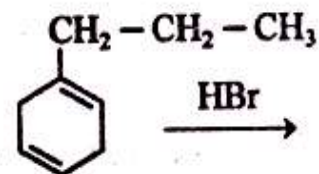
(f) Discuss Reimer-Tiemann reaction. Outline its mechanism.

Or

2. Answer all questions from the following : 2 × 8

(a) Give major product of the following reaction :

(3)



(b) Explain why the bromination of toluene is five time faster than that of o-butylbenzene.

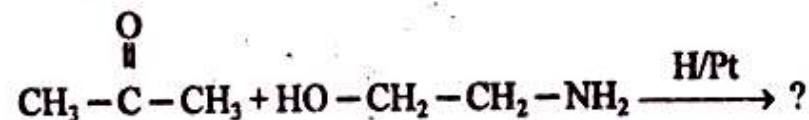
(c) Give reagents for the following conversion :



(d) Alkynes are less reactive than alkenes for electrophilic addition reaction. Explain.

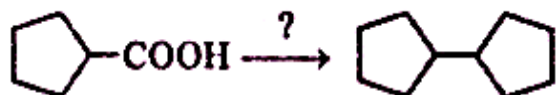
(e) NaBH_4 reduces aldehyde group more readily than Keto group. Explain.

(f) Predict the organic product :



(g) How will you bring about the following conversion :

(4)



(h) Give major product of the following reaction :



SECTION - B

Answer all questions : 16×4

3. (a) (i) What are sigma and π complexes ? Discuss their role in aromatic electrophilic substitution. 8
- (ii) In the following pairs of ions, which will be the better leaving group in aliphatic electrophilic substitutions ? 4
- (I) $t\text{Bu}^{\oplus}$ and Me^{\oplus}
- (II) I^{\ominus} and I^{\oplus}
- (III) H^{\oplus} and D^{\oplus}
- (IV) Me^{\oplus} and MeO^{\ominus}

(5)

- (iii) Explain why CHCl_3 is more reactive than CHF_3 in SE_1 reaction. 4

Or

- (b) Write notes on : $4 + 4 + 4 + 4$
- (i) Activating and Deactivating group
- (ii) Ortho-para directors
- (iii) Ortho-para ratio
- (iv) Arenium ion mechanism.
4. (a) (i) Discuss mechanism of Free radical substitution at bridge head. Describe coupling of Alkynes and its mechanism. 8
- (ii) What is Sommelet-Hauser rearrangement ? Explain with mechanism. 8

Or

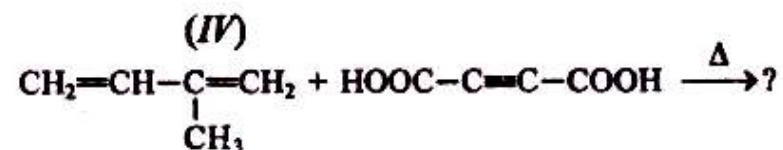
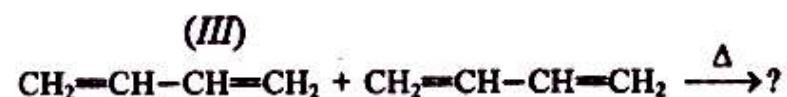
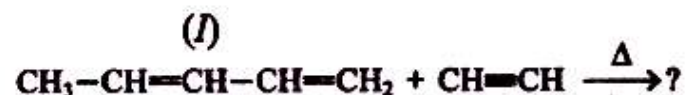
- (b) Write notes on : $5 + 6 + 5$
- (i) Differentiate between ArSN_1 and ArSN_2 reactions

(6)

(ii) Benzyne mechanism in ArSN reactions

(iii) Arylation of aromatic compounds by diazonium salts

5. (a) (i) Give the product of each of the following reactions : 2×4



(ii) Write notes on : 4×2

(I) Mechanism of E₂ reactions

(II) Peterson elimination reactions.

(7)

Or

(b) Write short notes on : 4×4

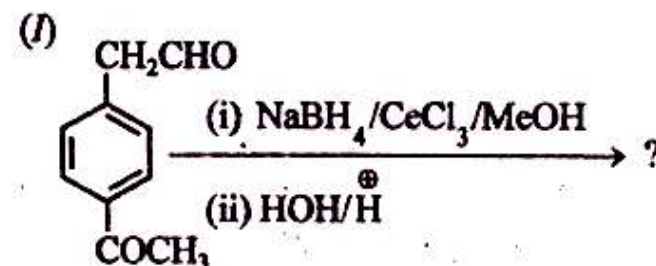
(i) Effect of structure of substrate, strength of the base and nature of the leaving group in E₁ reactions

(ii) Peterson elimination reactions

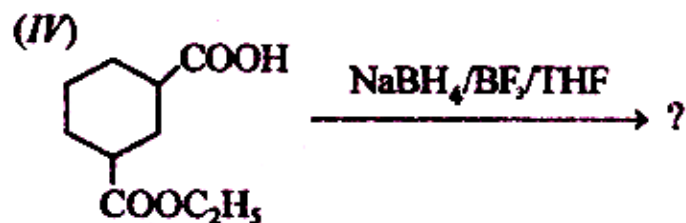
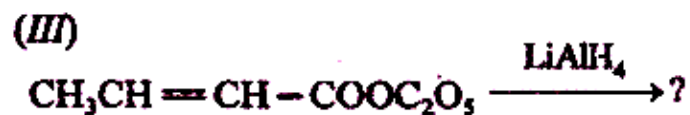
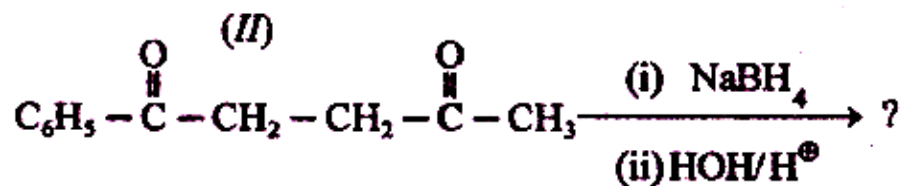
(iii) Comparison between E₁, E₂ and E_{1c}b reactions

(iv) What is Michael addition reaction? Give examples.

6. (a) (i) Indicate the expected products of the following reaction : 2×4



(8)



(ii) Write short notes on : $2 + 2 + 2 + 2$

- (I) Oxidations of amines
- (II) Oxidation of ketones
- (III) Reduction of esters
- (IV) Reduction of alcohols.

Or

(b) (i) How will you bring about the following conversions : 2×4

(9)

- (I) Acid chloride to Aldehyde
- (II) Ester to Aldehyde
- (III) Anhydride to Primary alcohol
- (IV) Carboxylic acid to primary alcohol.

(ii) Give synthetic applications of the following reagents : 2×4

- (I) Moist Silver Oxide
- (II) SeO_2
- (III) Lead Tetra Acetate
- (IV) Grignard reagents.