



CHE 504

M.Sc. (Ist SEMESTER) EXAMINATION, 2023-24

(CBCS MODE)

CHEMISTRY

(Organic Reaction Mechanism)

Time : Three Hours]

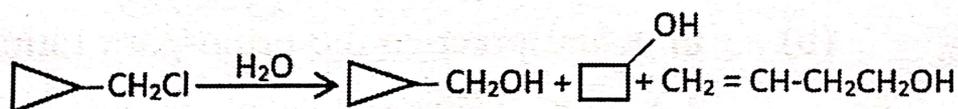
[Maximum Marks : 75

Note: There are **three** sections (A, B and C) and candidate has to attempt all questions. Marks are indicated against each section.

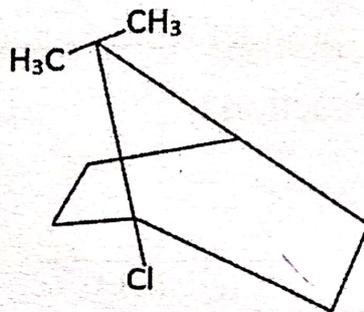
Section-A

1. Answer all questions : 5×3=15

- (a) What is isotopic labelling ? Discuss its importance in determining the mechanism of an organic reaction.
- (b) Differentiate between intermediate and transition state with proper Justification.
- (c) Show the mechanism of following reactions :



(d) Give the products with mechanism :

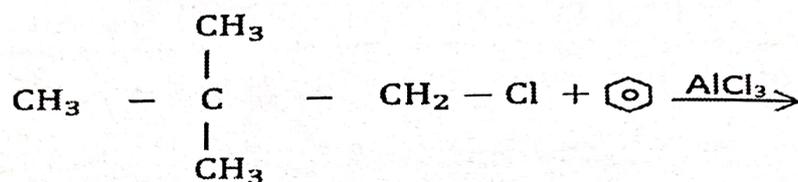


- (e) Explain Meisenheimer complex is negatively charged with proper Justification.

Section-B

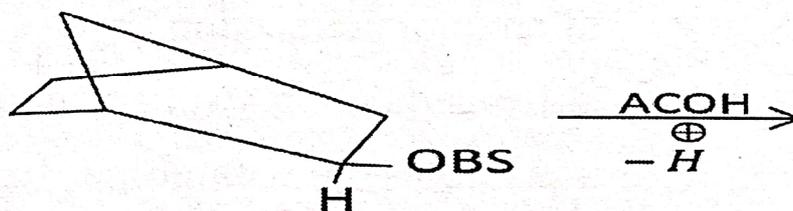
Note: Answer all questions of the following : 4×5=20

2. (a) Outline the mechanism of the following reaction :



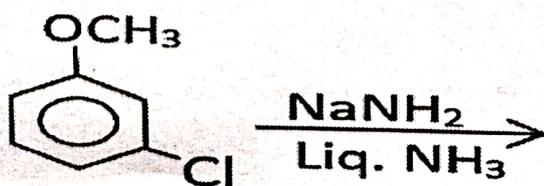
Or

- (b) Explain Ipso-substitution with suitable examples in details.
3. (a) Give the mechanism of the following reaction :



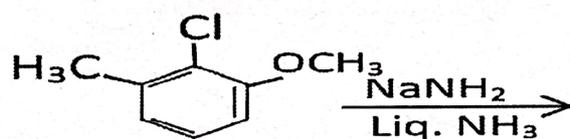
Or

- (b) In actual practice the ortho-para ratio is not 2 : 1 in electrophilic substitution reaction. Explain with suitable examples.
4. (a) Give the product and major one of the following reaction :



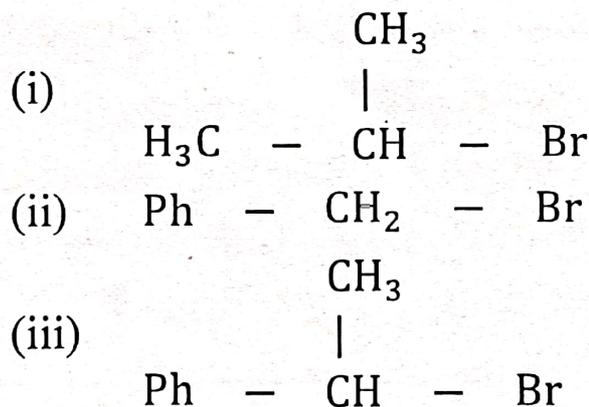
Or

- (b) What is a chimeric assistance explain with suitable examples ?
5. (a) Give the mechanism and product of the following reaction :



Or

- (b) Arrange the following alkyl halides in decreasing order of their hydrolysis (aq. NaOH) under SN_1 condition ; with reason :



Section-C

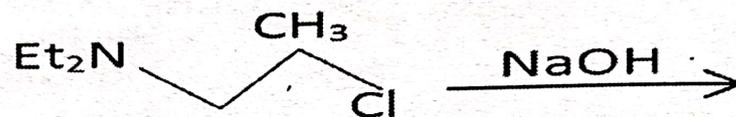
Note: Answer any two questions of the following : $2 \times 20 = 40$

6. Discuss SN^2 reaction by taking into account of its :
- Mechanism
 - Stereo chemistry
 - Nature of the substrate

(iv) Comment critically on E_1 , E_2 and E_{1cb} elimination reactions.

7. (i) What is open Cram's model for diastereoselectivity in the addition of nucleophiles to carbonyl compounds ? Explain with examples.

(ii) Rationalize the following :



8. (i) What is Sharpless Asymmetric Epoxidation (SAE) ? Give its mechanism.

(ii) Trapping of intermediate is a versatile method of determination of organic reaction mechanism. Justify it with example.

9. (i) Discuss the mechanism of Friedel-Crafts reaction. Explain why only small amount of $AlCl_3$ is used ? What are limitations of Friedel-Crafts alkylation ?

(ii) Outline the mechanism of the following reaction :

