

Roll No.

74053

M. Sc. Chemistry 2nd Sem.
(For Affiliated Colleges)
Examination – May, 2016

ORGANIC CHEMISTRY

Paper : CH-407

Time : Three Hours]

[Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note: Attempt *five* questions in all. Question No. 1 is *compulsory*. Further attempt *one* question from each Section. All questions carry equal marks.

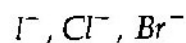
1. Explain briefly the following : 2 × 8 = 16

- (a) When methyl bromide is hydrolysed using hydroxide ions, methanol and bromide ions are produced. What will be the rate of reaction if conc. of methyl bromide is tripled and that of hydroxide ions doubled ?

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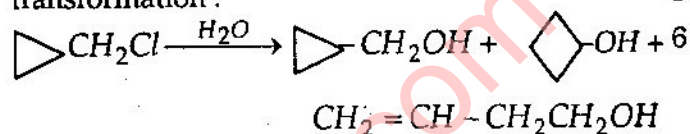
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- (b) Arrange the following nucleophiles in order of increasing nucleophilicity with reasons:



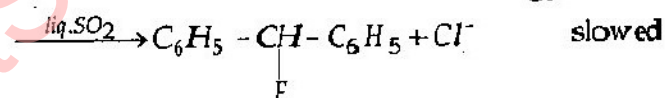
- (c) Why vinyl halides are inert towards nucleophilic displacement reactions?

- (d) Sketch a suitable mechanistic scheme for this transformation: 8



- (e) Why in presence of base, trans-2-chlorocyclohexanol reacts readily to give epoxide while cis-2-chlorocyclohexanol forms epoxide for more slowly?

- (f) Why the rate of reaction $F^- + C_6H_5 - \underset{Cl}{\underset{|}{CH}} - C_6H_5$



down by addition of chloride ions from outside?

- (g) Why does quinuclidine reacts faster than triethylamine with isopropyl bromide in an SN^2 reaction?

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- (h) How do you account for racemisation of (+) 2-iodobutane when it is allowed to react with iodide ions?

SECTION - A

2. Write short notes on the following (any four):

4 × 4 = 16

- Applications of NMR spectroscopy in detection of carbocations.
- Non-classical carbocations.
- Ambident nucleophile
- Wagner-Meerwein rearrangement.
- Phase transfer catalysis.

3. (a) Explain anchimeric assistance in nucleophilic substitution reactions. 9

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- (b) In general, it has been said that S_N1 reactions of optically active compounds are accompanied by racemization. But in actual practice it has been found that there is always some net inversion. How do you account for this observation? 4
- (c) Why (+) 4-Bromo-2-pentene forms a racemic product on treatment with sodium iodide? 3

SECTION - B

4. (a) What do you understand by Benzyne mechanism? Discuss. 5
- (b) Discuss effect of leaving gp and solvent polarity on reactivity in aliphatic electrophilic substitution. 6
- (c) Give an account of quantitative treatment of reactivity in substrate and electrophiles. 5

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5. Write notes on any four of the following: $4 \times 4 = 16$

- (a) Diazonium coupling.
- (b) Von-Richter reaction.
- (c) Sommelet-Hauser rearrangement.
- (d) Gatterman-Koch reaction.
- (e) Effect of substrate structure on reactivity in aromatic nucleophilic substitution.

SECTION - C

6. (a) Discuss the orientation in elimination reactions with particular reference to Saytzeff and Hofmann rules. 7
- (b) How can you distinguish between $e1$ and $e1cB$ reactions by labelling experiment? 3
- (c) Write a note on regio and chemo selectivity. 6

74053- (P-7)(Q-9)(16) (5)

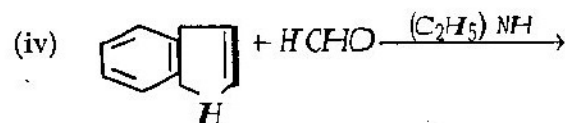
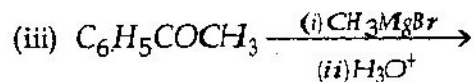
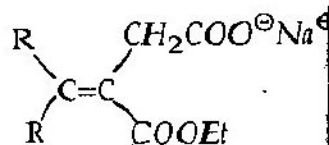
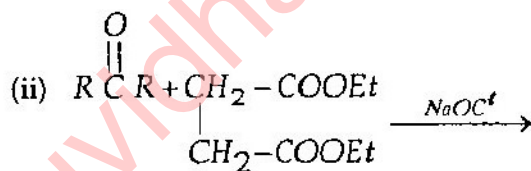
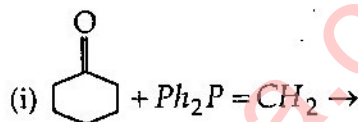
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7. Give the mechanism of: $4 \times 4 = 16$

- (a) Michael reaction.
- (b) Sharpless asymmetric epoxidation.
- (c) Pyrolytic eliminations.
- (d) Addition reactions involving free radicals.

SECTION - D

8. Predict the product of following reactions giving mechanism: $4 \times 4 = 16$



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9. (a) Give the mechanism of hydrolysis of amides and ammonolysis of esters. 8

(b) Give an account of addition of organo-lithium reagents to carbonyl and unsaturated carbonyl compounds. 6

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