

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

SIXTH SEMESTER – APRIL 2010

CH 6609/CH 6603 - SYNTHETICS ORGANIC CHEMISTRY AND SPECTROSCOPY

Date & Time: 22/04/2010 / 9:00 - 12:00 Dept. No.

Max. : 100 Marks

PART – A

Answer **ALL** questions.

(10×2=20 marks)

1. Mention any two guiding principles for choosing alternate synthesis routes.
2. What do you mean by construction reaction?
3. Sodium borohydride is a very selective reducing agent - justify.
4. What is hydroboration reaction?
5. What is TMS? Write its structure.
6. A compound with molecular formula $C_2H_4Br_2$ shows two signals (one doublet and one quartet) suggest the structural formula.
7. Calculate λ_{max} value for the following.

8. Cis -1,2 dichloro ethene is IR active whereas trans -1,2 dichloro ethene is IR inactive. Explain.
9. Predict the product.

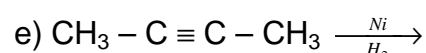
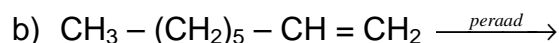
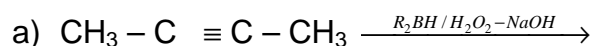
10. Complete the reaction.

PART – B

Answer any **EIGHT** questions.

(8×5=40 marks)

11. What do you understand by linear and convergent synthesis? Explain.
12. What is the significance of protecting group in organic synthesis?
13. Discuss Corey's analysis on Synthon approach.
14. Explain Birch reduction and predict the possible product in the reduction of o-xylene.
15. Complete the following reactions.



(P.T.O.)

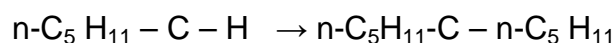
16. Complete and discuss the Stereochemistry of the following reaction.
17. What are chromophores and auxochromes? Give two examples for each.
18. The analytical data and the molecular mass determination gave C_8H_8O as the molecular formula. The compound burns with a sooty flame and gave an oxime with hydroxylamine hydrochloride. Following absorption bands appear in its IR Spectrum: (i) 2825 cm^{-1} (ii) 2717 cm^{-1} (iii) 3060 cm^{-1} (iv) 1700 cm^{-1} (v) 830 cm^{-1} . Deduce the structure of the compound.
19. Discuss the mechanism of the following reaction.
20. Give the significance of McLafferty rearrangement.
21. Explain spin - spin splitting with a suitable example.
22. Discuss shielding and deshielding of protons in NMR.

PART – C

Answer any **FOUR** questions.

(4×10=40 marks)

23. a) Explain Umpolung synthesis. (5)
 b) Using Umpolung concept convert the following reaction. (5)



24. Explain the following. a) Wolf-Kishner reduction. (5)
 b) Applications of Catalytic hydrogenation. (5)
25. a) Conjugated dienes absorb at a higher λ_{max} as compared to isolated diene. Comment on this statement.
 b) How will you differentiate between salicylic acid and m-hydroxy benzoic acid using IR spectra.
26. (i) Suggest some common protective groups for functional groups like
 a) Carbonyl b) alcohol c) amine d) Carboxylic acid (4)
- (ii) A compound with molecular formula $C_6H_{12}O_2$ shows four signals
 a) Singlet 1.1 δ (6H) b) Singlet 2.1 δ (3H) c) Singlet 2.6 δ (2H) d) Singlet 3.9 δ (1H)
 Propose its structure. (6)
27. Using ethyl aceto acetate, how will you synthesise the following:
 a) γ - keto valeric acid b) 2,5- pentanone c) Crotonaldehyde d) n-butane.
 e) 4-methyl uracil.
- 28.a) A compound with molecular weight 130 gave a negative iodoform test. It absorbs at 292 nm in the UV Spectrum. In its IR Spectrum the various bands are 3042 cm^{-1} , 2941 cm^{-1} , 2862 cm^{-1} , 1722 cm^{-1} , 1605 cm^{-1} , 1575 cm^{-1} and 1462 cm^{-1} . In the NMR Spectrum there are three signals at 7.3 δ (multiplet 5H), 2.8 δ (doublet 2H) and 9.8 δ (triplet 1H). Identify the structure of the compound. (7)
 b) Discuss any two fragmentation modes in mass spectroscopy. (3)

\$\$\$\$\$\$