



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**B.Sc. DEGREE EXAMINATION – CHEMISTRY**

**SIXTH SEMESTER – NOVEMBER 2016**

**CH 6603/CH 6609 – SYNTHETICS ORG.CHEM. & ORG. SPECTROSCOPY**

Date: 16-11-2016

Dept. No.

Max. : 100 Marks

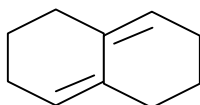
Time: 01:00-04:00

**PART A**

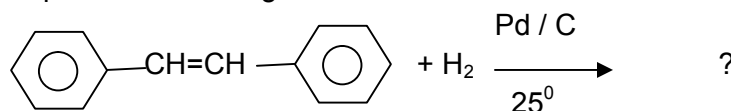
**Answer all questions**

**10 x 2 = 20**

1. What are protecting groups? Give one example.
2. The following compound does not undergo Diels Alder reaction why?



3. Nitration of benzaldehyde is much slower than benzene. Give reason.
4. Complete the following reaction



5. What is Wolf Kishner reduction?
6. What are active methylene groups? Give one example.
7. What is an isotopic peak? Give an example.
8. Define coupling constant.
9. What is an auxochrome? Give an example.
10. Which of the following isomers 1,3 pentadiene or 1,4 pentadiene will show the longest wavelength in UV absorption?

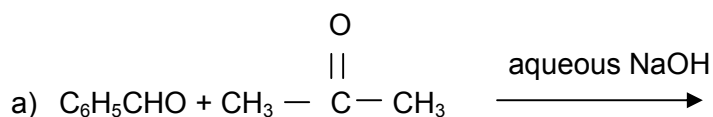
**PART B**

**Answer any eight questions**

**8 x 5 = 40**

11. What do you mean by retrosynthetic analysis? Explain it with a suitable example.
12. Explain linear and convergent synthesis with example.
13. What is TMS? Why is it chosen as the reference standard in NMR spectroscopy?
14. Explain Nitrogen rule.
15. What are the various types of electronic transitions and give its energy diagram?
16. Explain hydroboration reaction and highlight its synthetic importance.
17. What is the role of DIBAL in reduction reactions?

18. How will you distinguish inter and intra molecular hydrogen bonding using IR spectroscopy?
19. Predict the multiplicity of the signals in  $^1\text{H}$  NMR of  
 a) Diisopropyl ether                      b) 1,3 dichloropropane
20. Explain the stereochemistry of Diels Alder reaction.
21. Complete the following:



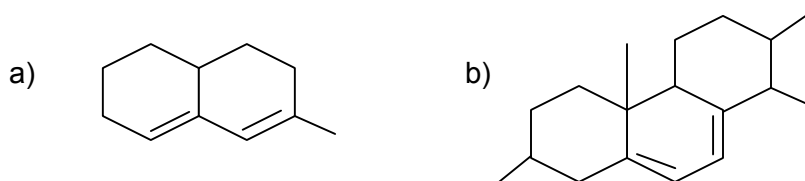
22. How are the following groups protected and deprotected in organic synthesis  
 a)  $-\text{OH}$                       b)  $-\text{NH}_2$

### PART C

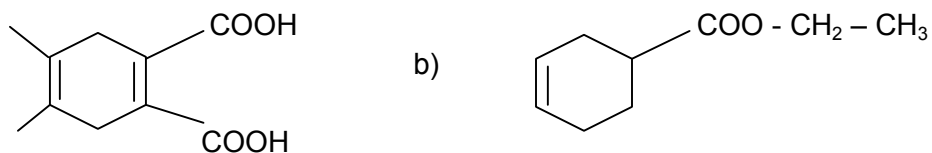
Answer any four questions

4 x 10 = 40

23. a) Describe the principle of mass spectroscopy. (5)  
 b) Illustrate the Mc Lafferty rearrangement with an example. (5)
24. a) Describe the modes of vibration in IR spectroscopy. (6)  
 b) Calculate  $\lambda_{\text{max}}$  of the following compound: (4)



25. a) Compare the reducing nature of  $\text{LiAlH}_4$  and  $\text{NaBH}_4$ . (6)  
 b) Draw the diene and dienophile for the following Diels Alder adduct (4)



26. a) Explain Umpolung synthesis (5)  
 b) Using umpolung synthesis convert benzaldehyde to acetophenone. (5)
27. a) Using malonic ester how will you synthesize the following (6)  
 i) Succinic acid    ii) Barbituric acid    iii) Crotonaldehyde.  
 b) Discuss Shielding and deshielding mechanism. (4)

28. a) A neutral liquid with the molecular formula  $C_9H_{10}O$  which answers iodoform test. Following are the values for UV, IR,  $^1H$  NMR and mass spectra. Find out the structure and explain. (6)

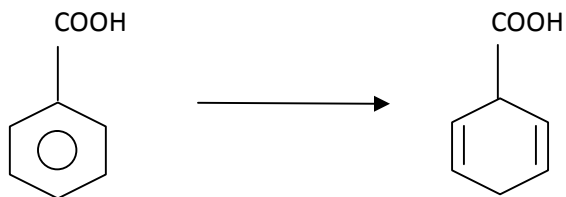
$^1H$  NMR  $\delta$  7.2(s),  $\delta$  2.1 (s),  $\delta$  3.7 (s)

IR  $3000-3050\text{ cm}^{-1}$ ,  $1700\text{ cm}^{-1}$ ,  $2850 - 2950\text{ cm}^{-1}$

Mass  $m/$  134, 119, 91

UV  $\lambda_{\text{max}}$  200nm, 230nm.

b) How will you effect the following transformation? (4)



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