Register No:
Date

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27

B.Sc Chemistry-V SEMESTER

SEMESTER EXAMINATION: OCTOBER 2022
(Examination conducted in December 2022)

CH 5118- ORGANIC CHEMISTRY

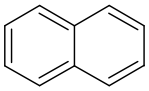
Time-2 ½ hrs **Max Marks-70**

This paper contains **three** printed pages and **three** parts

Part A

Answer any **SIX** questions. 2 X 6 = 12 Marks

1. Give the general reaction for the preparation of 2º alcohol using organolithium compound.
2. Identify the following as aromatic, antiaromatic or nonaromatic and give reason.



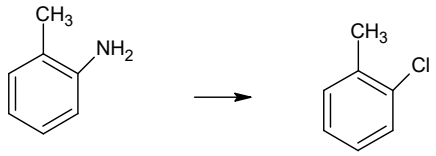
3. What is TMS? Give one reason why TMS is used as internal standard in ^{1}H NMR spectroscopy?
4. Write the increasing order of basicity of 1º, 2º and 3º amines in gas phase.
5. Give one general method of preparing an aldehyde.
6. What is the electrophile in each of the following aromatic substitution reactions i) nitration ii) sulphonation?
7. Between 1, 3-butadiene (CH_2=CH-CH=CH_2) and 1, 4-pentadiene (CH_2=CH-CH_2CH=CH_2), which will absorb at longer wavelength? Justify your answer.
8. What is Hofmann elimination reaction?

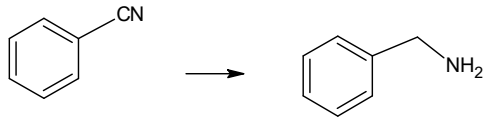
Part B

Answer any **EIGHT** questions. 6 x 8 = 48 Marks

9. Using resonance structures of the intermediate arenium ions formed, explain the orienting influence and reactivity of -NO_2 group towards aromatic electrophilic substitution reactions.
10. Give all the steps involved in the synthesis of 2- methylhexanoic acid by malonic ester synthesis.

11. a) How would you bring about the following conversions?

i) 

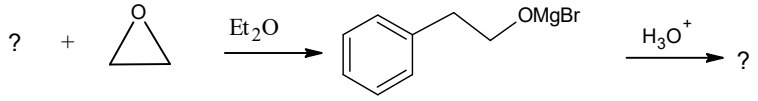
ii) 

b) Write the reaction of toluene ($C_6H_5CH_3$) with i) hot alkaline $KMnO_4$ followed by acidification ii) N-bromosuccinimide (NBS) in the presence of UV light. (3+3)

12. a) Explain shielding and deshielding in ^1H NMR taking $CH_3CHBrCH_3$ as an example.
b) How many signals are expected in the proton NMR spectrum of impure CH_3CH_2OH? Give the multiplicity of each signal. (3+3)

13. a) What is Michael addition? Give an example.
b) Write the i) hemiacetal formation reaction and ii) acetal formation reaction when a ketone reacts with an alcohol. (3+3)

14. a) Complete the following reactions.



b) Between aldehydes and ketones, which is more reactive towards nucleophilic addition? Why? (3+3)

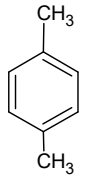
15. a) How would you synthesize a primary amine by reductive amination?
b) Explain Wittig reaction with a suitable example. (3+3)

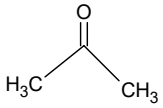
16. a) Write the steps involved in preparation primary amines by Gabriel synthesis.
b) Give an example of Claisen condensation. (3+3)

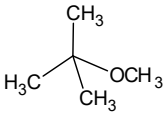
17. a) Give the mechanism for the addition of a strong nucleophile to aldehyde or ketone.
b) What is tautomerism? Write keto-enol tautomers of acetone. (3+3)

18. a) Give the general mechanism for nucleophilic addition-elimination reaction of carboxylic acid derivatives.

b) How many signals would each compound give in its ^{1}H NMR spectrum?

i) 

ii) 

iii) 

(3+3)

Part C

Answer any **TWO** questions. 5 x 2 = 10

19. Starting from benzene, how do you prepare *p*- nitroaniline?

20. Propose the structure of the organic compound with the molecular formula C_8H_9Br, from the chemical shift values in ^{1}H NMR spectrum given below. Assign the spectral signals to the structure you propose.

δ (ppm)	splitting	Integration
2.0	d	3H
5.15	q	1H
7.35	m	5H

21. Starting from propanal (CH_3CH_2CHO) how would you prepare hexanol ($CH_3CH_2CH_2CH_2CH_2CH_2OH$)?

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