Register Number:
Date:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27
B.Sc. V SEMESTER
SEMESTER EXAMINATION: OCTOBER 2023
(Examination conducted in November/December 2023)
CH 5123 – ORGANIC CHEMISTRY
(For current batch students only)

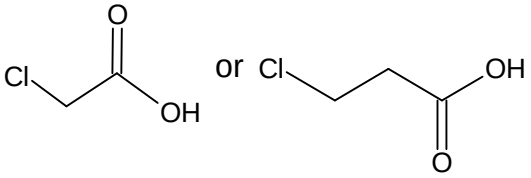
Time: 2 Hours **Max Marks: 60**

This paper contains 3 printed pages and 3 parts.

PART A

Answer any **seven** questions. (7x2= 14)

1. How does RMgX react with CH_3OH? Write the chemical equation.
2. Give an example for the synthesis of ketones by the ozonolysis of alkenes.
3. How do you prepare carboxylic acids by the carbonation of Grignard reagents? Give an example.
4. Which of the following is a stronger acid? Give reason.



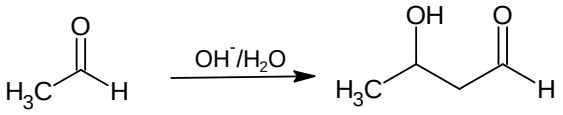
5. Write the products formed when i) propanenitrile (CH_3CH_2CN) is reduced using DIBAL-H and ii) ethanol (CH_3CH_2OH) is oxidized using pyridinium chlorochromate (PCC).
6. Which is more reactive towards electrophilic substitution reactions, pyrrole or furan? Give reason.
7. Why is pyridine more basic than pyrrole?
8. State isoprene rule. How many isoprene units are present in citral?
9. Write the chemical equation for the oxidation of glucose using bromine water.

PART B

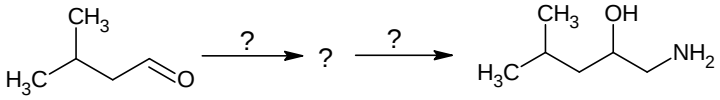
Answer any **six** questions. (6x6= 36)

10. a) Write chemical equations for the following reactions. (3+3)
    i) a ketone with RNH_2 ii) an aldehyde with hydroxylamine (NH_2OH)
    iii) an aldehyde with the ylide, $CH_3\bar{C}H\text{-}\overset{+}{P}(C_6H_5)_3$
    b) Explain why the α-hydrogens in a carbonyl compound are acidic in nature.

11. a) Write the mechanism of the following aldol addition. (3+3)



b) Provide the missing reagents and intermediate in the following synthesis.

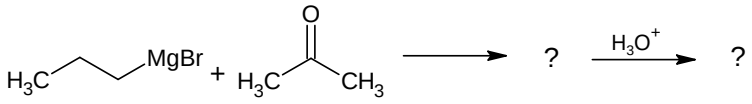


12. a) Arrange the following compounds in the increasing order of their basicity in the gaseous state. Justify the order. (3+3)

$(CH_3)_2NH$ CH_3NH_2 NH_3 $(CH_3)_3N$

b) Give examples to show the synthesis of primary amines by i) reductive amination and ii) reduction of oximes.

13. Write the major product in each of the following reactions.

i) 

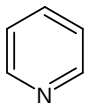
ii) $(CH_3)_2CuLi$ $\xrightarrow{I(CH_2)_nCOOH}$?

iii) 

$\xrightarrow{(CH_3CO)_2O,\ BF_3}$?

iv) 

$\xrightarrow{SO_3,\ pyridine}$?

v) 

$\xrightarrow{HNO_3+H_2SO_4}$?

14. a) Write the open chain (Fischer formula), Haworth and conformational (pyranose) structures of glucose. (3+3)

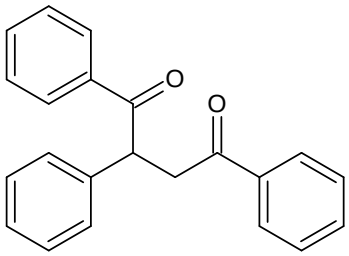
b) How do you confirm the presence of a pyridine ring in nicotine?

15. What is Kiliani Fischer synthesis? Explain with an example.
16. Explain the aromaticity of pyrrole based on resonance theory. Draw the orbital diagram.
17. Explain Claisen condensation with the mechanism.

PART C

Answer any **two** questions. (2x5= 10)

18. a) Identify the starting materials to obtain the following compound by Michael addition. (3+2)



b) Predict the major product formed in the Baeyer-Villiger oxidation of 3-methyl-2-butanone.

19. How would you synthesize 3-propyl-2-hexanone by acetoacetic ester synthesis?
20. Outline the steps involved in the following conversions (i) and (ii) (hint: through diazonium salts).