Date:

Registration number:

ST. JOSEPH'S UNIVERSITY, BENGALURU-27
M.Sc. CHEMISTRY - IV SEMESTER
SEMESTER EXAMINATION: APRIL 2024
(Examination conducted in February 2024)
CHDE 0323-Green Chemistry and Diversity of its Applications

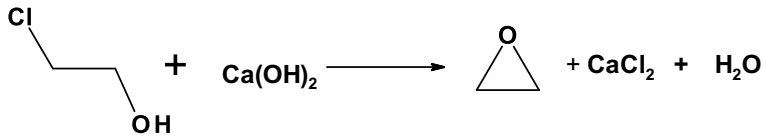
Time- 2 h **Max Marks-50**

This question paper contains **THREE** printed pages and **THREE** parts

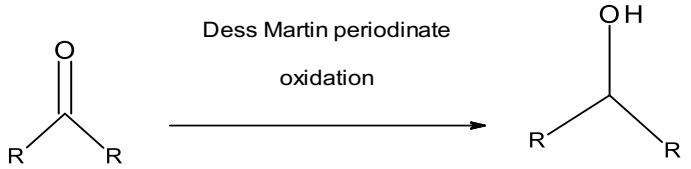
Part A

Answer any **eight** of the following ten questions. **(2 X 8=16 M)**

1. Draw the structure of Sertraline.
2. How do you differentiate between batch reactor and continuous stirred tank reactor?
3. What do you mean by supercritical fluids? Mention any one application.
4. Draw the partial structure of Wang and Sasrin resins.
5. Write the chemical reaction of Swern-Moffatt oxidation.
6. Which of the following solvents would you choose for a microwave reaction? Benzene, ethanol or toluene? Support your choice based on tan δ.
7. Differentiate between enamine and iminium ion organocatalysis.
8. Analyse the following reaction in terms of E-factor and suggest whether this is a green reaction or not.



9. Explain the steps involved in ball-milling reactions.
10. Examine whether the following reaction is 'isohypsic' or not. Why?



Part B

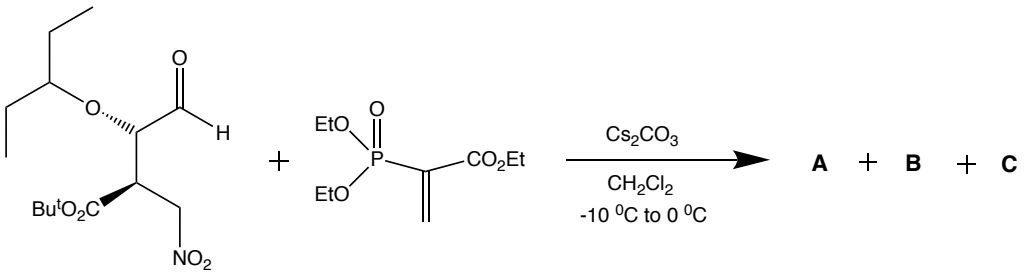
Answer any **two** of the following three questions **(12 X 2=24 M)**

11. (a) Explain the modified method of synthesis of quinapril. Mention its greener aspects.
(b) List and discuss the process parameters involved in ball milling.
(c) Extraction coefficients for tetra-n- butylammonium bromide between water and various organic solvents are listed below. Evaluate the given data and choose the best organic solvent for extraction of the onium salt and defend your choice. **(6+3+3)**

Solvent	Extraction coeffcient
Diethyl ether	1.1
Dichloro methane	25
Chloroform	47
n-butanol	69

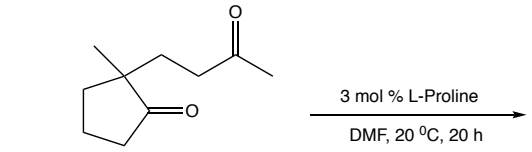
12. (a) Compare the commercial launch and improved process for celecoxib. Discuss its ecological footprints.
(b) Describe how ultrasound brings about reactions and list the risk/s involved.
(c) Illustrate two approaches for the preparation of crown ethers. **(6+3+3)**

13. (a) Discuss the mechanism of N-oxide promoted Baeyer-Villiger oxidation reaction using a suitable example.
(b) Illustrate the application of Merrifield resin for the synthesis of peptides. Highlight the reagents for deprotection and coupling.
(c) Provide the structures of the three intermediates in the following multicomponent reaction.

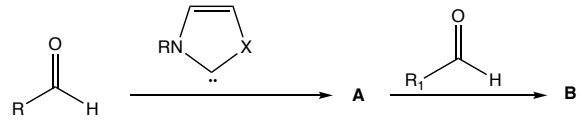


(d) Complete the following reactions: **(3+3+3+3)**

(i)



(ii)



Part C

Answer any **two** of the following three questions **(5 X 2=10 M)**

14. In the process of drug development, it was found that convergent synthesis makes an important contribution to green chemistry. Prove the aptness of this statement using a suitable example.
15. (a) Chemical library can be developed for variously substituted bis-amides. Which of the following reactions would you: Mannich reaction, Michael-Horner Wadsworth Emmon's reaction, Ugi reaction or Passerini reaction? Write the chemical reaction you choose.
    (b) Suggest a route to synthesize a heterocyclic compound using malononitrile under PTC conditions. **(3+2)**
16. (a) You are required to carry out an oligosaccharide synthesis. You are provided with the following strategies: PEG-OMe polymer, tag assisted polystyrene and polystyrene linked amino propyl linker. Which of these three strategies would you prefer if (i) solubility of oligosaccharide is required during synthesis (ii) if you have to purify by recrystallisation from ethanol (iii) if purification by liquid-liquid extraction is required?
    (b) Method of stirring a solution of $(Bu)_4N^+ I^-$ with an aqueous solution of NaCl to convert to $(Bu)_4N^+ Cl^-$ by ion exchange is not very successful. What may be the reason? Suggest an alternate method (Chemical reactions needn't be written). **(3+2)**

x……End of questions……x