Date:

Registration number:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27
B.Sc. CHEMISTRY - IV SEMESTER
SEMESTER EXAMINATION: APRIL-2022
(Examination conducted in July 2022)

CH 418 – CHEMISTRY-IV

Time- 1 hour 30 minutes Max. Marks-35

This question paper contains two printed pages, three parts and thirteen questions.

Part A

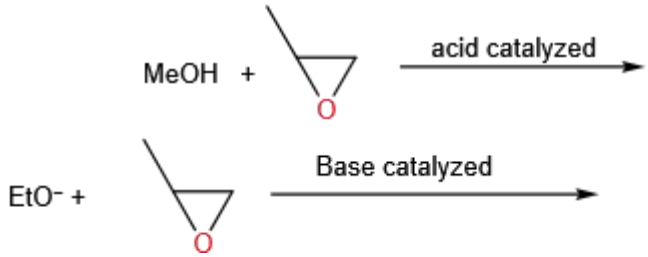
Answer any three questions. Each question carries two marks. (2 X 3 = 6)

1. Identify the nucleophile and leaving group in the following reaction:
   $NaI + CH_3CH_2Br \longrightarrow CH_3CH_2I + NaBr$
2. Give a method of preparation of an epoxide (oxirane) from an alkene.
3. Illustrate Markovnikov's rule with a suitable example.
4. Draw the structure of *(E)* and *(Z)* isomers of 1-bromo-2,3-dimethyl-2-pentene.
5. Between the two alcohols given below which is more acidic? Explain your answer.

Part B

Answer any four questions. Each question carries six marks. (4 X 6 = 24)

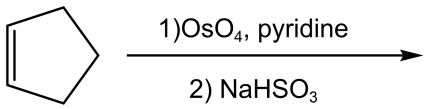
6. With the help of an energy profile diagram explain the mechanism and stereochemistry of S_N1 reaction.
7. Explain the electrophilic addition reaction of HBr to 1,3-butadiene. What is the distribution of products under kinetic and thermodynamic control? Draw the energy profile diagram for this reaction.
8. i) Give a method of synthesis of alkyne from a) vicinal dihalide and b) geminal dihalide.
   ii) Write the major product formed in the following reactions. (3+3)



9. i) Give the rate equation for an E1 elimination of an alkyl halide and discuss the mechanism.
   ii) Give any two factors that would favour E2 reaction over S_N2 reaction. (3+3)

10. i) What is the major product formed in the oxymercuration-demercuration reaction of 1-pentene?
ii) Explain Zaitsev's rule by taking the dehydrohalogenation of 2-bromo-2-methylbutane as an example. (3+3)

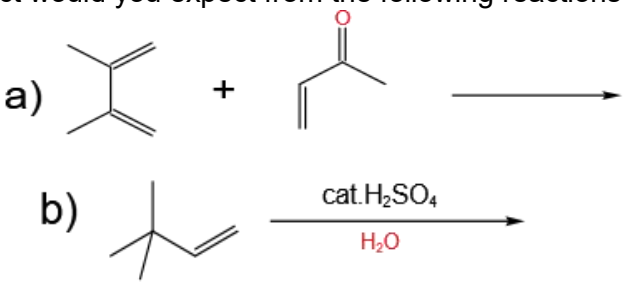
11. i) Complete the following reaction and indicate the stereochemistry of the product.



ii) Arrange the halide ions (I^-, F^-, Cl^-, Br^-) in increasing order of their leaving group ability in nucleophilic substitution reaction and justify your order. (3+3)

Answer any one question. Each question carries five marks. (1 X 5 = 5)

12. i) Which would you expect to be the stronger nucleophile in a polar protic solvent?
a) H_2O or H_2S b) $(CH_3)_3P$ or $(CH_3)_3N$
ii) What major product would you expect from the following reactions? (2+3)



13. Identify A, B, C, D and E in the following reaction sequence.